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MEASUREMENTS OF THE FLOW FIELD
IN THE CCRL TUNNEL FURNACE
AT VARIOUS SWIRL INTENSITIES

by

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SUMMARY

This report presents measurements of the flow field in the CCRL tunnel furnace at seven different swirl intensities under isothermal conditions. Velocity profiles were recorded at the swirl generator exit, the transition section exit, and at three stations in the furnace. At low swirl, the flow was found to be asymmetrical, while at higher swirl, a large central recirculation was established which led to nearly symmetrical flow.

RESUME

Ce rapport présente des mesures du champ d'écoulement dans la fournaise tunnel des Laboratoires de recherches sur l'énergie (CANMET) sous conditions isothermes. Les profils de vitesse ont été mesurés à la sortie du brûleur, à la sortie de la section de transition, et à trois stations dans la fournaise à sept degrés de tourbillonnement. Pour les tourbillonnements de basse intensité, l'écoulement avait une asymétrie marquée. Dans les écoulements de tourbillonnement fort, il s'est formé une zone grande de contre-courant central, qui a produit un écoulement presque symétrique.

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NOMENCLATURE

m	mass flow	kg/s
p	pressure	p_a
r	radius	m
R	radius of flow outer boundary	
R_T	radius of swirl generator outlet	
S	swirl number based on axial momentum	
S'	swirl number based on thrust	
u	axial velocity	m/s
v	radial velocity	m/s
w	tangential velocity	m/s
ρ	density	kg/m ³
ζ	shear stress	

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1. Introduction

This report details the results of measurements of the flow field in the CCRL tunnel furnace in isothermal flow, including the exit velocity profiles from the moving block type swirl generator and refractory quartz used. The measurements were undertaken to provide data for computer modelling of the furnace. The following chapter describes experimental conditions and sources of error, while Ch. 3. comments on the measured results. Complete computer printouts of the velocity profiles are to be found in the Appendix.

2. Experimental Procedure

This chapter describes the experimental techniques used, and includes information on the furnace geometry, measurement of air flows, probe measurement techniques and data reduction.

2.1 Description of Burner and Furnace

Fig. 2.1 shows a schematic of the test furnace and ancillary equipment. Air entered through an IFRF moving-block swirl generator, which was connected to the CCRL horizontal tunnel furnace by a quarl or transition section lined with refractory. Primary air, supplied by a centrifugal blower, entered through a straight axial tube ending in a short conical diffusor with an exit diameter of 95.3 mm. A Roots blower provided the secondary flow, which passed through the swirl generator proper. Both flow rates were measured with orifice meters, and the temperatures of the two streams were monitored with built-in thermocouple probes. U-tube and inclined tube manometers were used for orifice pressure measurement. Fig. 2.2 gives details of the quarl, while Fig. 2.3 shows the section of the furnace tunnel in which measurements were made. Access to the tunnel for probes was available through three ports, which were capped when not in use. The furnace exhaust passed through an induced draft fan which could be controlled to make the furnace pressure equal to the outside pressure, thus preventing flow through any part which was open for measurement. An inclined manometer connected to a pressure tap in one of the closed parts provided a rough means of setting the draft, while small pieces of tissue paper suspended in the open part were used to indicate the draft for fine adjustment.

Figure 2.1 also shows the five planes at which velocity profiles were measured. For measurements at the swirl generator and quarl exits, the lack of access ports made it necessary to detach the swirler and the quarl from the furnace. At the swirl generator exit, the line of traverse was 2 mm from the exit plane, while at the quarl exit the need to rotate the probe to detect recirculation made it necessary to measure 17 mm from the exit plane.

2.2 Experimental Conditions

All velocity measurements at the swirl generator and quarl exits were made at two mass flow rates prescribed by CCRL (Table 2.1), while those for the three furnace measurement locations were only made at high

TABLE 2.1 — MASS FLOW RATES, kg/s

	Primary	Secondary
Low Flow	0.0457	0.1235
High Flow	0.2055	0.5557

flow. With the average flow temperature of 35° , these correspond to Reynolds numbers based on the swirl generator exit diameter of 74,500 for low flow and 335,000 for high. In all cases, the primary flow was 27% of the total.

The error in setting the mass flows for each experimental run was estimated to be within $\pm 1\%$. The flow rates were carefully monitored during each run to ensure that conditions remained constant; however, periodic fluctuations in the mass flow of about 2% were observed during operation, probably the result of varying atmospheric conditions at the furnace exit.

2.3 Probe Description and Measurement Procedure

A United Sensors type DC-125-24-F-18-CD five-hole Pitot probe (Fig. 2.4), was used to determine all local velocity components in the flow. The probe was introduced radially into the flow, so that the local axial and tangential velocity components u and w lie in a plane normal to the probe axis, while the radial velocity v is parallel to the probe shaft. The "goose neck" shape of the end of the probe is designed to reduce the effect of probe disturbances at the measuring point (see 2.5). A traversing slide held the probe and allowed its radial position to be read to within 0.1 mm.

The measurement procedure used was as follows: The probe was first rotated until $P_2 = P_3$, thus bringing the local velocity vector into the plane formed by holes 1, 4, and 5 and the gooseneck of the probe. The pitch angle α was then read off a protractor fastened to the probe shaft. The yaw angle β was then determined from $(P_4 - P_5)/(P_1 - P_2)$, using the manufacturer's calibration curve. Next, β was used to find the coefficient $(P_{TOTAL} - P_{STATIC})/(P_1 - P_2)$, giving the magnitude of the velocity vector V_T , and finally the static pressure is taken from a third curve. The velocity components are then

$$\text{axial} \quad u = V_T \cos \beta \cos \alpha$$

$$\text{radial} \quad v = V_T \sin \beta$$

$$\text{tangential} \quad w = V_T \cos \beta \sin \alpha$$

The probe was restricted by construction and calibration to yaw angles $\beta < 40^\circ$. For much larger angles a more complex probe, such as a 9-hole probe with a spherical head, would be required.

Two capacitive pressure transducers were employed to measure the probe pressure differentials: an MKS-Baratron 10-torr transducer for $(P_1 - P_2)$ and $(P_2 - P_3)$, and a Furness Controls 50 mm H₂O unit for $(P_4 - P_5)$. Pressures were read out on a chart recorder; since pressures fluctuated strongly in some regions of the flow, this means of readout yielded both the measurement of the average pressure and some idea of the local turbulent fluctuations. Transducers and recorder were checked and corrected periodically for zero drift.

2.4 Data Reduction

The task of evaluating velocity components from the measured pressures was performed by a FORTRAN computer program, a copy of which appears in the Appendix. The probe calibration curves are approximated in this program by ninth degree polynomials.

The resulting velocities are made dimensionless by dividing by a reference velocity

$$V_{\text{ref}} = \frac{\dot{m}}{\pi \rho R_T^2}$$

where $R_T = 76.2$ mm is the swirl generator exit radius. For measurements at the swirl generator exit only, the mass flow used here was that integrated from the measured axial velocities

$$\dot{m}_I = 2\pi \int_0^R \rho u r dr \quad \text{kg/s}$$

whereas for all other measurement stations the actual mass flow $\dot{m}_M$ as read from the orifice meters was used. In using $\dot{m}_I$ at the swirler exit, the intention was to "cancel" the apparent increase in velocity

induced by turbulence (see 2.5), thus giving a more nearly correct picture of the actual velocities. This was not done for the other stations because their flows proved for the most part to be unsymmetrical, making $\dot{m}_I$ unreliable.

Pressures are reported as

$$(p - p_W) / p_{ref}$$

where p_W is the "wall" pressure, here always equal to zero (atmospheric), and

$$p_{ref} = \frac{\rho V_{ref}^2}{2}$$

A number of integral quantities are evaluated by the program by integrating the measured data over the radius using the trapezoid rule. These are

— the recirculated mass flow

$$\dot{m}_R = 2\pi \int_0^r \rho \frac{(|u| - u)}{2} r dr \quad \text{kg/s}$$

— reported both for the inner region (central recirculation) and the outer region near the wall

— made dimensionless by $\dot{m}_I$

— the angular momentum flux

$$G_\phi = 2\pi \int_0^R \rho u w r^2 dr \quad \text{N-m}$$

— the axial momentum flux

$$G_x = 2\pi \int_0^R \rho u^2 r dr \quad \text{N}$$

— the pressure force

$$P = 2\pi \int_0^R p r dr \quad N$$

— the thrust

$$T = G_x + P \quad N$$

— the swirl number

$$S = \frac{G_\phi}{R_T G_x}$$

— the swirl number based on thrust

$$S' = \frac{G_\phi}{R_T T}$$

— the axial kinetic energy flux

$$E_{ax} = 2\pi \int_0^R \rho u \frac{u^2}{2} r dr \quad J/S$$

— the tangential kinetic energy flux

$$E_{tan} = 2\pi \int_0^R \rho u \frac{w^2}{2} r dr \quad J/S$$

— the total kinetic energy flux

$$E_{kin} = \pi \int_0^R \rho u (u^2 + v^2 + w^2) r dr \quad J/S$$

— the pressure energy flux

$$E_p = 2\pi \int_0^R u p r dr \quad J/S$$

These quantities are made dimensionless using the following quantities:

- a reference momentum flux $\dot{m} V_{ref}$ (for momentum flux, pressure force, thrust)
- a reference angular momentum flux $\dot{m} V_{ref} R_T$
- a reference energy flux $\frac{1}{2} \dot{m} V_{ref}^2$

For comparison with measured static pressures, a theoretical static pressure based on a simple centrifugal force balance is calculated and tabulated as a function of radius:

$$p_{th} - p_w = \int_r^R \rho \frac{w^2}{r} dr$$

where p_w in this case equals atmospheric pressure or 0. This equation actually comes from the second Navier-Stokes equation:

$$\rho u \frac{\partial v}{\partial x} + \rho v \frac{\partial v}{\partial r} - \frac{\rho w^2}{r} = - \frac{\partial p}{\partial r} + \frac{1}{r} \frac{\partial}{\partial r} (r \zeta_{rr}) - \frac{\zeta_{\phi\phi}}{r} + \frac{\partial}{\partial x} \zeta_{xr}$$

the simplified equation is hence strictly only valid if v and the shear stresses are negligible. Finally, stream functions for mass, axial momentum and angular momentum are tabulated:

$$\begin{aligned} \psi(r) &= \frac{2\pi}{\dot{m}_I} \int_0^r \rho u r dr \\ \psi_x(r) &= \frac{2\pi}{\dot{G}_x} \int_0^r \rho u^2 r dr \\ \psi_\phi(r) &= \frac{2\pi}{\dot{G}_\phi} \int_0^r \rho u w r^2 dr. \end{aligned}$$

These all attain a value of 1 at the wall and 0 at the axis.

As mentioned previously, a yaw angle $\beta > 40^\circ$ is not within the probe calibration range; any data point giving $\beta > 40^\circ$ is hence rejected by the

program. This would correspond physically to a high radial velocity, but a few of the points rejected in this fashion were obviously spurious measurements made in regions of very high turbulence. If the point rejected is on the axis of the flow, a special procedure is required, because the integral quantities cannot be evaluated without the axis point. The solution used is take the axial velocity from the next nearest point, and set $v = w = 0$ (symmetry conditions).

2.5 Error Analysis

The major sources of error in measuring local velocities in the experiments lie in the interaction between the probe and the flow field. Three main areas can be identified here: (a) disturbance of the flow by the probe; (b) effects of turbulence on the measured pressures; and (c) effects of velocity gradients.

- (a) Probe disturbances can be an important cause of error in swirling flows. When the flow is stagnated by the probe shaft, the radial pressure gradient which is always present in a rotating flow can act to produce a radial flow along the probe shaft [1]. The direction of this unwanted flow depends on the sign of the total pressure gradient, but is usually inward, towards the flow axis. If recirculation is present, it is possible that the wake of the probe can be carried upstream and cause a disturbance to the oncoming flow. At the boundary of a recirculation zone, where the axial velocity becomes zero, the probe head could actually lie in its own wake, causing considerable error. Although observations in laminar flow have shown that probes can influence the

size and occurrence of central recirculation zones, Gouldin [2] suggests that fully turbulent flows should be nearly immune to random disturbance.

- (b) Apart from disturbances, whose effect is difficult to quantify, turbulence is the most important aerodynamic source of error. As a rule, the pressure measured at any one of the probe taps will be increased by pressure fluctuations parallel to the axis of the tap and decreased by fluctuations across its face [3]. The net effect depends on the strength of the various fluctuating components. Hallat [4] estimates the errors incurred in five-hole probe measurements in isotropic turbulence as

relative error in velocity

$$\frac{\Delta V}{V} < \frac{1}{3} \frac{k^2}{V^2}$$

relative error in static pressure

$$\frac{2 \Delta p_{st}}{\rho V^2} \approx - \frac{2}{3} \frac{k^2}{V^2}$$

where

$$V^2 = u^2 + v^2 + w^2$$

and k^2 = kinetic energy of turbulence. The yaw and pitch angles are not affected at all. Estimates of the turbulence levels in the furnace in the present case were made by measuring the width of the fluctuating pressure trace drawn by the chart recorder; these gave $k^2/V^2 \approx 10 - 15\%$, corresponding to a turbulence intensity of 30-40%. This would suggest an error of some 5-8% in the velocity, and 20-30% in static pressure. In comparison,

Hallett and Günther [5] measured turbulence intensities of 50-60% in a similar swirling flow in a sudden expansion.

- (c) A velocity gradient at the point of measurement will shift the location of the stagnation point on the head of the probe, changing the direction and magnitude of the measured velocity. The measured pitch angle will not be affected, because there are no gradients in the tangential direction in a symmetrical flow, but the yaw angle and radial velocity can suffer large errors. This effect is most pronounced when a large probe is used in a region with sharp changes of velocity. In the present experiments, since a small probe was used, this effect is only likely to be significant in the gradient regions near the boundaries of recirculation zones.

To sum up the preceding discussion, the measured quantities can be ranked roughly in order of decreasing accuracy:

- pitch angle (most accurate)
- axial, tangential velocities
- yaw angle
- radial velocity
- static pressure (by far the least accurate).

Relative to the aerodynamic effects just discussed, the errors in the actual pressure measurement are slight. The error band of the Baratron transducer is quoted by the manufacturer as 0.3% of reading, which coupled with the chart recorder would give an overall error of about 1%. Zero drift would increase this error somewhat in measuring low velocities.

Two additional sources of aerodynamic disturbance must be mentioned. The first is the effect of motion of the surrounding room air on the flow at the swirl generator and quarl exits; as mentioned previously, the lack of access ports made it necessary to detach these components from the furnace and measure their flows as free jets. In spite of efforts to keep nearby doors closed, the effect of drafts in the lab hall could not be entirely excluded, and led to increased turbulence and error at the low flow setting. Secondly, the flow in the furnace itself, although enclosed, could be influenced by drafts through the open port. Although great care was taken to balance the furnace drafts, it was impossible to avoid fluctuations and gusts caused by the wind outside the building.

Some geometrical errors in the test furnace were unavoidable. The refractory quarl was about 1 cm out of round and the furnace interior likewise showed some irregularity; however, it is not believed that this played a significant role in producing the marked flow asymmetries recorded. The mechanism for adjusting the swirl generator had some backlash, so that the procedure was adopted of always rotating the handwheel in the direction of increasing swirl when setting the swirl.

A measure of the overall error in measurement can be had by comparing the mass flow $\dot{m}_I$ integrated from the velocity distribution with that from the two orifice meters $\dot{m}_M$. Values of $\dot{m}_I/\dot{m}_M$ are tabulated in Table 3.1. Many of these deviate strongly from 1 because of asymmetries in the flow, but those for symmetrical flows (swirl generator exit, other locations at high swirl) indicate that measured velocities are on the average some 4-7% too high. This figure agrees well with the estimate of the effects of turbulence above.

3. Experimental Results

The results of the probe measurements are presented graphically as radial profiles of the axial, radial and tangential velocity components in Figs. 3.1-3.53 following. As an aid in interpreting the profiles, Figs. 3.29, 3.33, 3.38, 3.42, 3.46 and 3.50 give to scale the locations of the boundaries between forward and reverse flow for the entire flow field at the various swirl settings: these points were located with a "flag" (a tuft or piece of thin paper on a rod), used to determine the local flow direction. Complete computer printouts of all the velocity measurements and the integral quantities introduced in Section 2.4 are given in the Appendix.

Experimental conditions are identified by a code number on the velocity profiles and computer printouts, viz. :

S 20 H 1
↑ ↑ ↑ ↑
measurement location: traverse number
S = swirl generator exit H = high flow rate, L = low
Q = quarl exit swirl generator setting
1T, 2T, 3T = furnace tunnel, ports 1, 2 and 3

The sign convention used is that axial velocities are positive in forward flow and a positive v denotes a radial outflow, while w is assumed to be always positive.

3.1 Velocity Profiles at the Swirl Generator Exit (Figs. 3.1-3.14)

Measurements at the swirl generator exit were made at both high and low flow settings, and are presented together in the following figures. There is very little difference between the two flows, as one would expect at the high Reynolds numbers obtained here; in case of discrepancy, the measurements at high flow are considered to be the more reliable, for reasons given in 2.5.

As discussed in 2.4, the reference velocity V_{ref} used for these measurements was based on the integrated mass flow $\dot{m}_I$ rather than on the actual metered flow.

The primary air flow passes through a conical diffuser before exiting, and both the outward radial velocities and the thick wall boundary layer are typical of a diffuser flow. The off-centre maximum of the axial velocity and the fact that the radial component is not zero on the axis suggest a slight asymmetry, which is most likely due to the 180° bend in the hose connection to the primary air supply. As expected, the primary flow was not affected by swirl setting.

In the outer, swirling flow the axial velocity is nearly uniform at low swirl, while with further increasing swirl a maximum is developed which moves toward the outer boundary of the flow. This is consistent with measurements on similar swirl generators made by Leuckel [6]. The tangential velocity profiles show an almost pure solid body vortex form (w increasing linearly with r) at low swirl. This changes fairly abruptly at a swirl setting of 20 to something more nearly resembling the classical Rankine vortex, whose solid body core grows in diameter with increasing swirl. This behaviour can be explained in terms of the geometry of the

moving-block type of swirl generator: at low swirl, most of the air enters through the radial ports, and the little entering tangentially remains stratified at the outside of the flow, concentrating the swirl there. At moderately large swirl settings, the momentum of the tangential stream increases to the point where considerable mixing takes place, distributing swirl more evenly over the outlet section. Further increases in swirl result in larger losses and growth of the solid body core. At very high swirl these losses cause the swirler to "saturate" so that there is very little difference in profiles between settings 40 and 45.

The substantial radial velocities measured at high swirl are caused by the spreading of the free swirling jet; they would not be expected to occur when the swirl generator is attached to the quarl or the furnace. Apart from this, the velocity profiles measured here should not change significantly in enclosed flow because there is no recirculation at this location. Negative radial velocities near the central cone indicate the mixing of the two streams. A few points in the wake of the diffuser wall have been rejected.

Comparison of metered and integrated mass flows (Table 3.1) shows good agreement, the average error being about 7% at low flow and 4% at high flow. The integrated flow was too high in every case, indicating that this error is largely due to turbulence.

Fig. 3.15 gives the swirl number S (defined in 2.4) as a function of the swirl generator setting. The discrepancy between high and low flow results is due again to the higher error level at low flow.

3.2 Velocity Profiles at the Quarl Exit (Figs. 3.16-3.28)

Measurements at this section were also made at both flow settings, and again there is good agreement between results for high and low flow, although the measurement uncertainty was greater than at the swirl generator outlet owing to the lower velocity and higher turbulence intensities encountered. Drafts in the surrounding room had a particularly strong effect at the low flow rate here. To test the symmetry of the flow, three points on the far side of the axis were probed in addition to the complete traverse on the near side; these points are circled on the accompanying profiles. In a few cases, mainly near the boundaries of recirculation zones, meaningful measurements were impossible because of the low velocities and/or high turbulence intensities encountered. The resulting gaps in the measured axial velocity profiles have been filled in with a line indicating the probable shape of the profile, based on "flag" measurements of the recirculation boundaries. The reference velocity V_{ref} used here was calculated from the metered (actual) mass flow.

The data for low swirl (settings 00 and 05) show a marked asymmetry. The radial velocities indicate a flow towards the near side of the axis, so that the asymmetry is increasing with distance from the burner. (The ultimate effects of this can be seen in the flow maps in Figs. 3.29 and (3.33). Curiously, both tangential and axial velocity profiles show the symmetry axis of the flow to be on the near side of the geometrical axis at high flow and on the far side at low flow. It is suggested that this might be the result of some Reynolds number dependent effect involving the curved pipe or the valve supplying the primary air, since high and low flow profiles agree well outside the central core area. Mass balance errors

(Table 3.1) indicate the degree of asymmetry present. It is not surprising that this flow is asymmetrical, as this is normal behaviour in separated conical diffuser flows of moderate expansion angle $|7|$.

Measurements at a swirl setting of 10 show the axial velocity to be nearly uniform over the cross-section, a typical condition for a flow just below the critical swirl required to produce breakdown (central recirculation). The flow is asymmetrical, the maximum of the axial velocity and the rotational axis ($w = 0$) being displaced about 50 mm to the near side of the geometrical axis. High radial velocities indicate continued growth of this asymmetry. This setting proved very difficult for measurement: apart from the low flow velocities obtaining, and the resulting greater effects of drafts in the surroundings, the flow was found to be quite unstable, exhibiting large fluctuations. A hand or flag placed in the flow showed the presence of strong "gusts" or "puffs". This again is to be expected of a flow on the verge of breakdown. At this setting, the measurements indicated a large forward axial flow region at the axis, gradually dissipating to an extremely small outer recirculation.

Transition to a flow with central recirculation has occurred by a swirl setting of 20 (Fig. 3.21); because of the momentum of the primary flow, an annular recirculation zone is produced with forward flow in the centre. At 30 and above, the central recirculation zone becomes fully developed; its size remains constant with increasing swirl although the magnitudes of the backflow velocities increase. These flows were stable and nearly symmetrical, with good agreement between integrated and metered mass flows. Because of the rapid spread of the swirling jet, and the fact

that the probe had to be positioned 17 mm from the quarl face, the measured points extend some distance beyond the quarl boundary. The rather odd shape of the tangential velocity profiles results from transport of angular momentum upstream by the backflow.

The reported profiles, measured in a free jet flow, can be expected to differ slightly from those in the furnace enclosure. This will be particularly true where a strong recirculation is present, since this provides an opportunity for events in the furnace to influence the upstream flow directly.

3.3 Flow Measurements in the Furnace Tunnel (Figs. 3.29-3.54)

These measurements were made at the high flow setting only, as the velocities at the low flow rate would have been too small to be measured with the equipment available. Data from the swirl generator and quarl exit traverses suggest that the flow field at low flow rates would not differ significantly from the profiles presented here. The results of "flag" determinations of the recirculation boundaries (Figs. 3.29, 33, 38, 42, 46, 50) serve as an aid to orientation for the profiles for each swirl setting. The line of zero axial velocity is shown, not the bounding streamline of the recirculation. The reference velocity for these stations is based on the metered (actual) mass flow.

The flow fields at swirl settings of 0 and 5 are very unsymmetrical. The jet emerging from the quarl is directed to one side of the furnace, leaving a long "dead zone" of weakly recirculating flow on the opposite side. The origin of this can be found in the asymmetry of the quarl flow: the radial displacement of the flow axis at the quarl exit is magnified by

the action of the Coanda effect in the furnace. Although great care was taken in balancing the pressure across the measuring port, it is possible that this asymmetry may have been aided by the open port. The axial velocity profiles show the typical form of an enclosed jet. It is characteristic of sudden expansion flows that the outer recirculation zones fluctuate considerably in size and velocity [8]; these fluctuations made data acquisition in the outer parts of the flow very difficult.

Flow conditions at a swirl setting of 10 were so turbulent and unstable that even reliable "flag" measurements of flow direction were not possible. Only at the first port could some data be obtained, and it indicates again a very strong asymmetry (Fig. 3.37).

The establishment of a central recirculation zone stabilizes the flow and markedly improves its symmetry. At a swirl setting of 20 the annular recirculation observed at the quarl exit expands to a full central back-flow. The shape of the central zone (Fig. 3.38), suggests that the asymmetry here may actually have a helical form. Further increases in swirl to 30 and above produce a nearly symmetrical recirculation whose shape changes very little with swirl. Radial velocities at port 1 reflect the rapid expansion of the swirling jet; these velocities become negative in the back flow regions because of the reversal of the axial velocities.

Fig. 3.54 is a plot of streamlines in the flow at a setting of 45, together with velocity vectors (axial and radial components) plotted to scale. Because a number of points near the recirculation zone boundary at port 1 were rejected (Fig. 3.51), the stream functions are not accurate here and have been omitted in preparing Fig. 3.54. The location of the

zero streamline shows that recirculating flow occupies most of the furnace cross-section.

Fig. 3.55 illustrates the large mass flows recirculated by the inner backflow at high swirl. Detailed figures are given in the tables in the Appendix. Recirculation at port 1 has not been included in this figure, as the recirculation figures here were felt to be inaccurate owing to the rejection of data points near the backflow boundary.

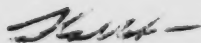
The ratios of integrated to metered mass flows are plotted in Fig. 3.56. This figure shows clearly that the very large mass flow errors obtained at low swirl are a direct result of the asymmetrical flow obtaining there. Only at the two highest swirl settings is the flow symmetrical enough to yield values close to the expected range of experimental error.

TABLE 3.1: Ratio of Integrated Mass Flow $\dot{m}_I$ to Metered Flow $\dot{m}_M$

Swirl Setting	Swirl Generator		Quarl		Tunnel (Port hole 1)	Tunnel (Port hole 2)	Tunnel (Port hole 3)
	Low	High	Low	High			
00	1.097	1.034	1.234	1.448	1.866	3.864	3.763
05	1.058	1.010	1.204	1.343	3.039	4.493	4.936
10	1.073	1.017	--	1.816	1.207	0.067	0.312
20	1.073	1.015	1.051	1.117	0.621	0.461	0.525
30	1.019	1.043	0.922	0.927	0.889	0.442	0.446
40	1.067	1.101	1.089	0.925	0.979	0.724	0.865
45	1.089	1.080	0.917	0.912	1.014	0.849	0.837

4. Conclusion

1. The velocity profiles at the swirl generator exit could be measured to within an accuracy of 5%.
2. The flow in the furnace at low swirl (below the value required to establish central recirculation) was highly asymmetrical and exhibited large fluctuations and unsteadiness.
3. At high swirl (swirl settings of 30 and above) the establishment of a strong central recirculation zone stabilized the flow and made it nearly symmetrical. The measurements in this range are considered to be the most reliable of the furnace data.
4. The asymmetry of the low swirl flows studied is characteristic of diffuser/expansion flows and is not caused by irregularities in the symmetry of the furnace or burner.



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Ottawa, 21/9/84

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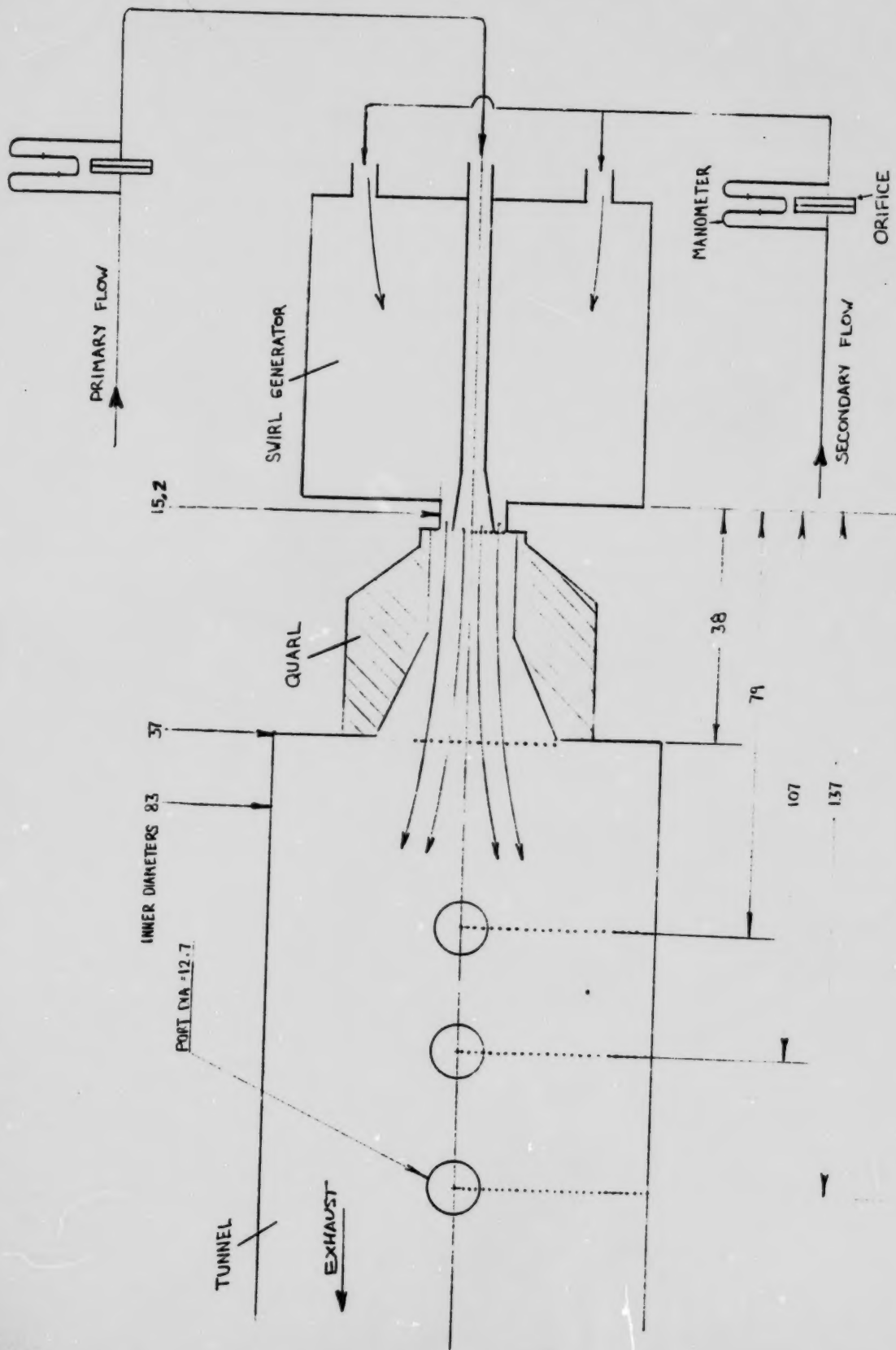


Fig. 2.1: Schematic of CCRL tunnel furnace and burner. Dimensions in cm.

ALL DIMENSIONS IN CM.

TRAVERSE LOCATIONS -

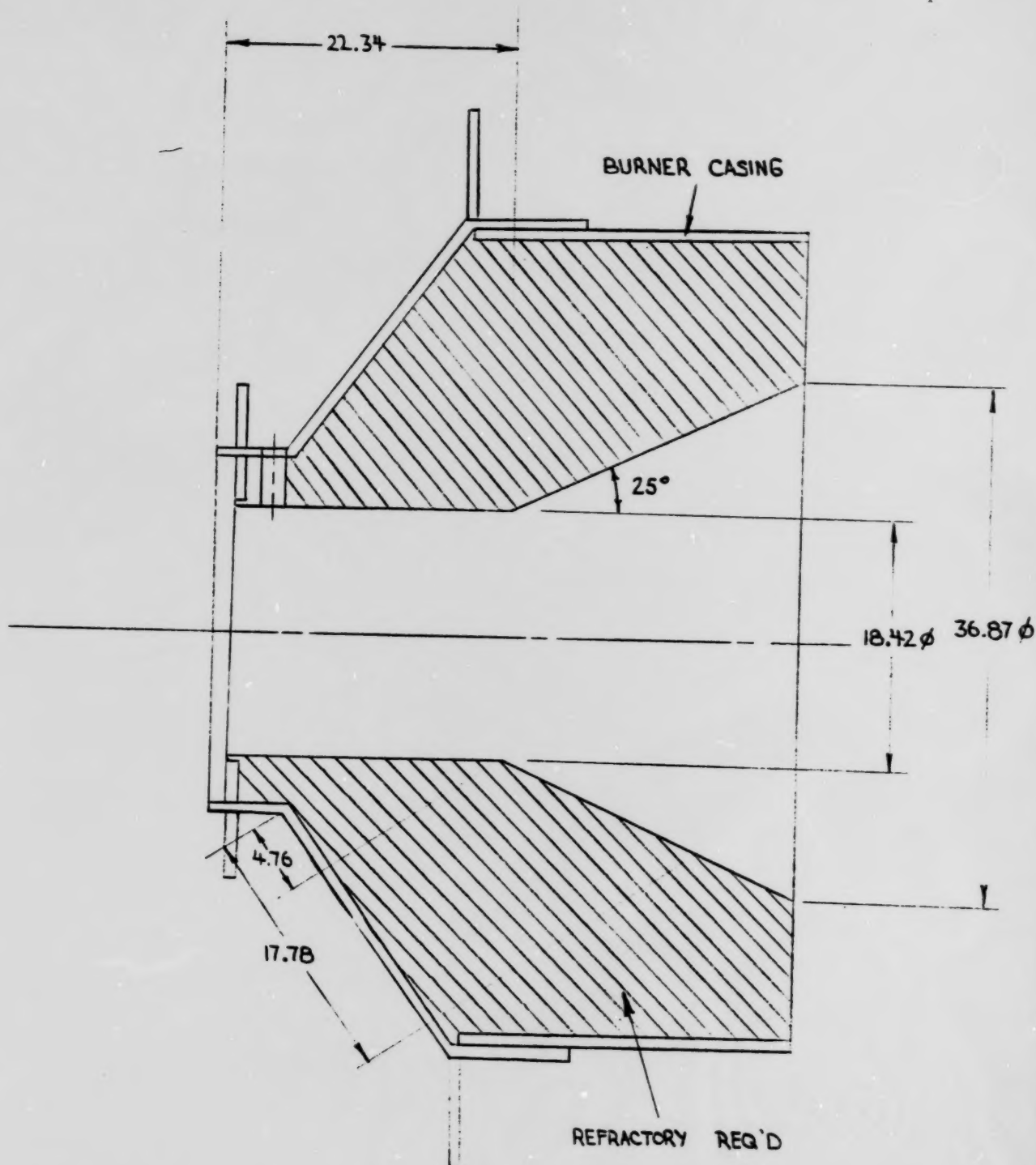


Fig. 2.2: Refractory quarl (transition section).
From EMR drawings.

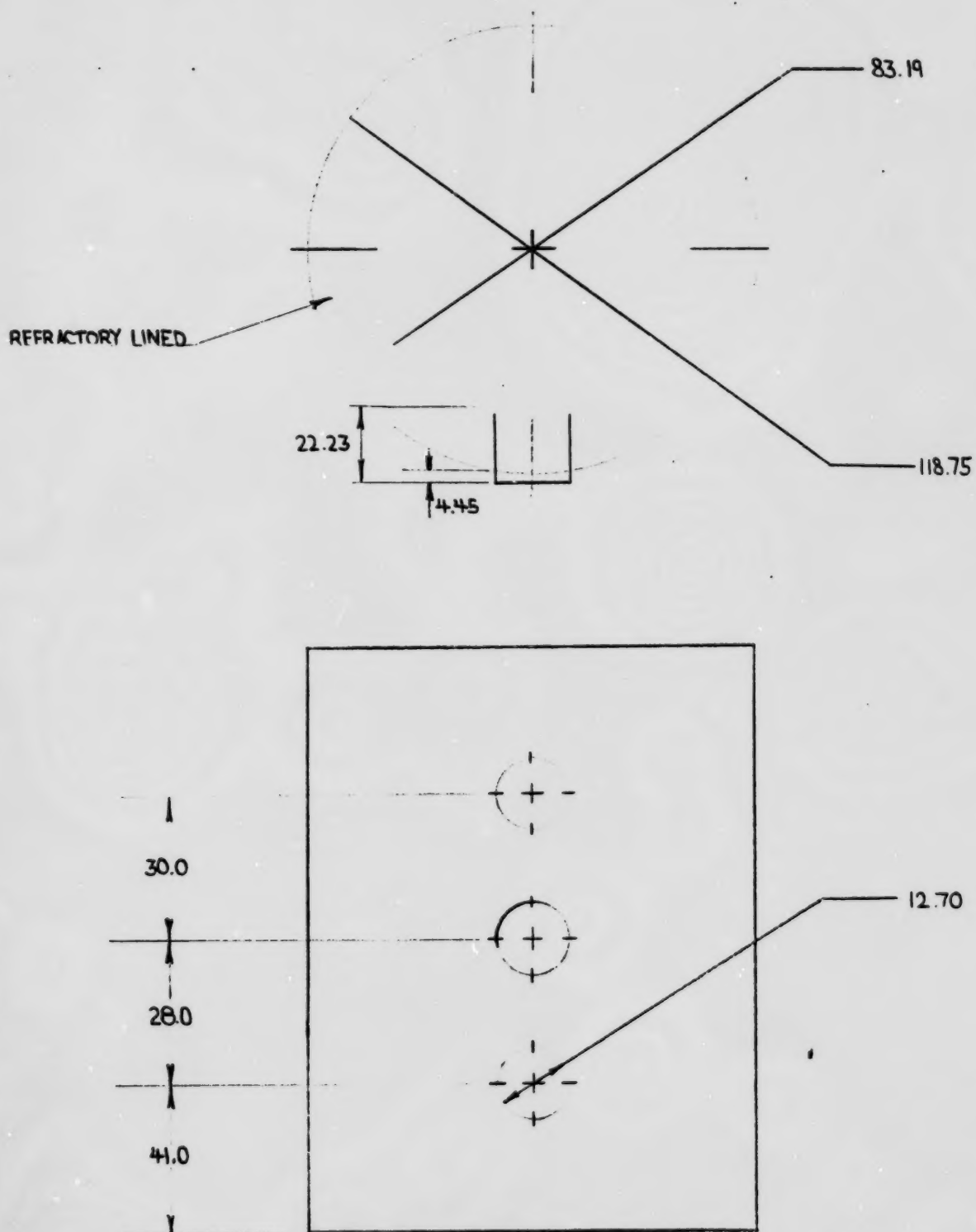


Fig. 2.3: Initial section of furnace tunnel, showing ports for measurement. From EMR drawings.

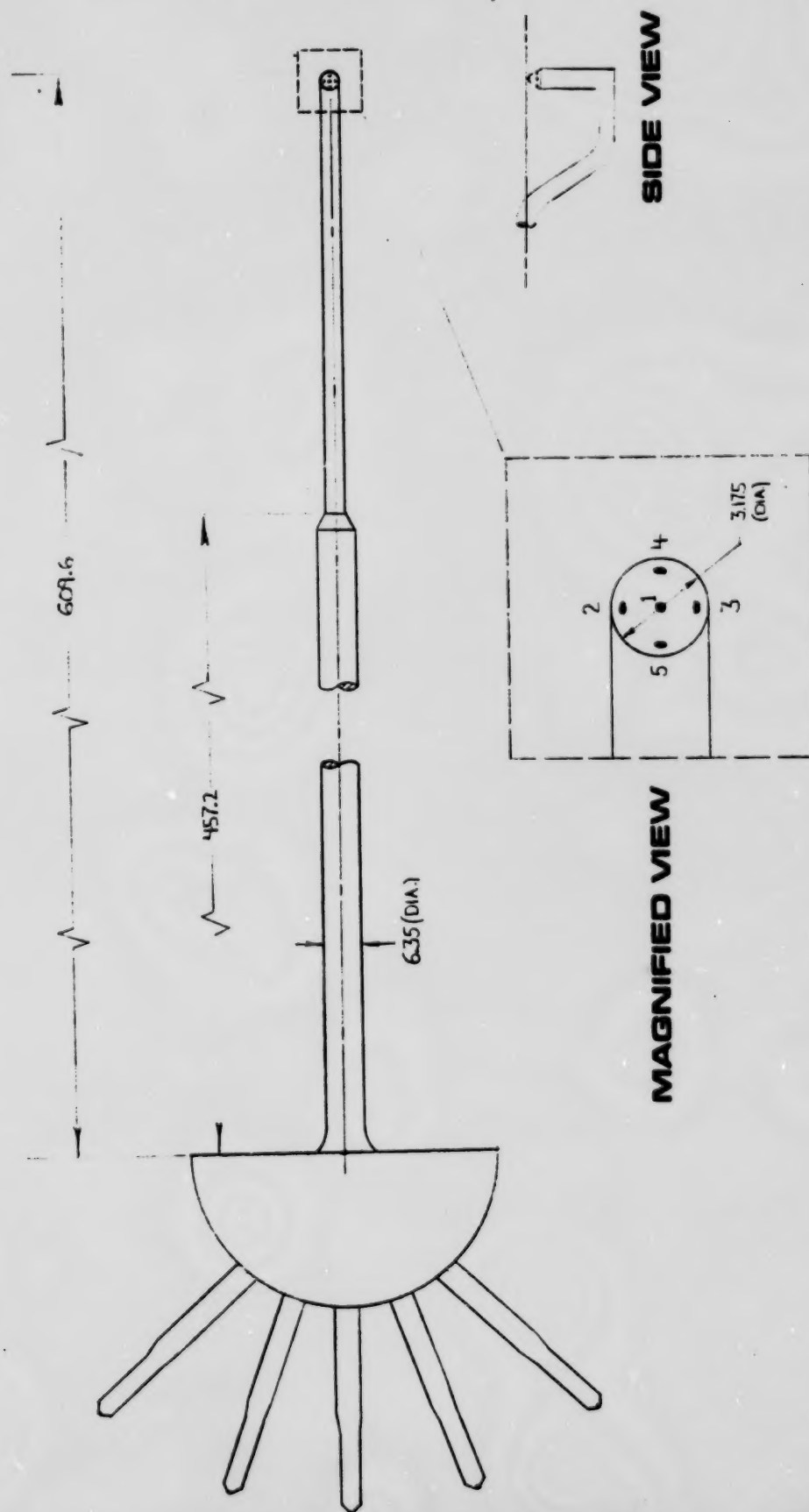


Fig. 2.4: Sketch of the five-hole probe. Dimensions in mm.

Fig. 3.1:

EXPERIMENT NO. S00H1

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- * RADIAL VELOCITY/VREF

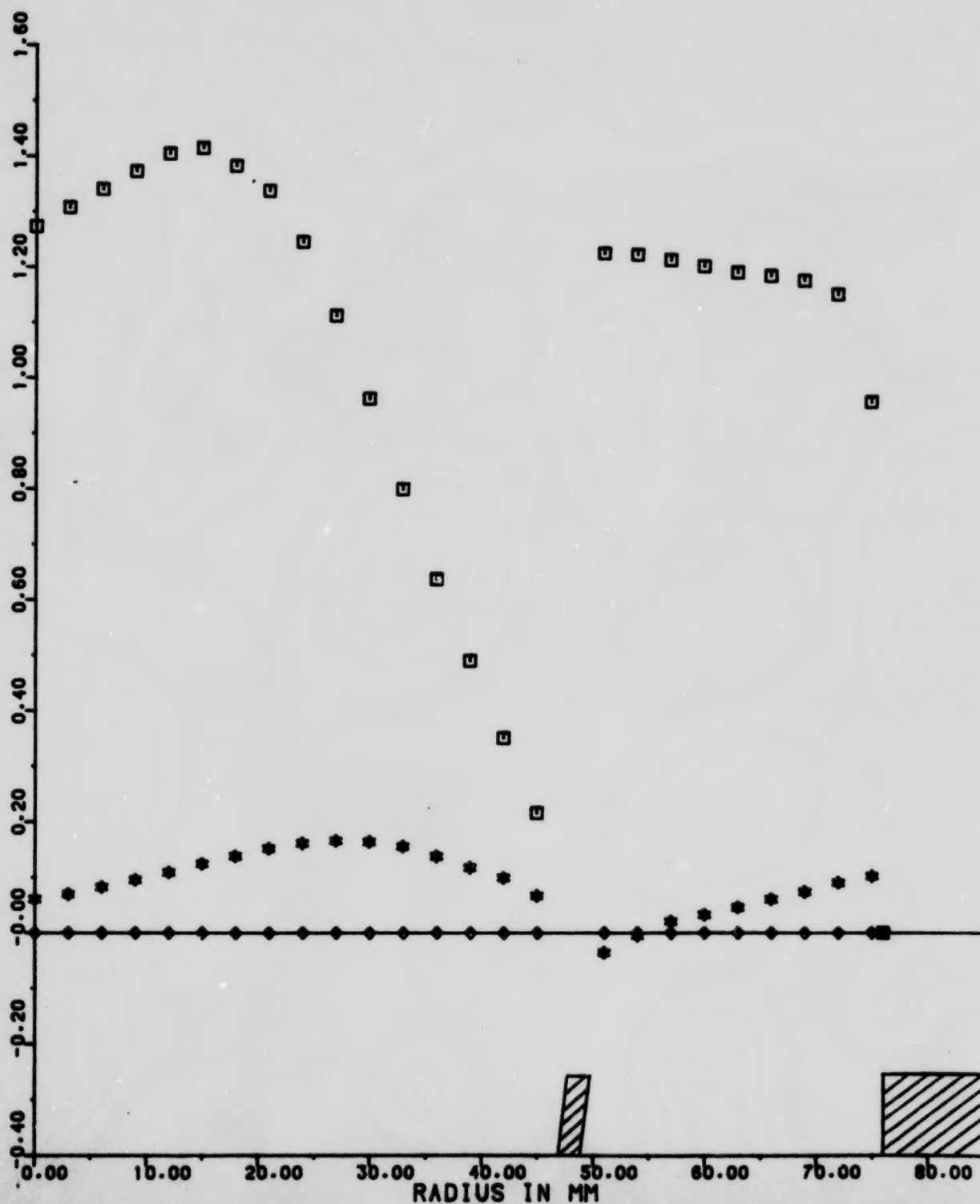


Fig. 3.2:

EXPERIMENT NO. S00L2

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- * RADIAL VELOCITY/VREF

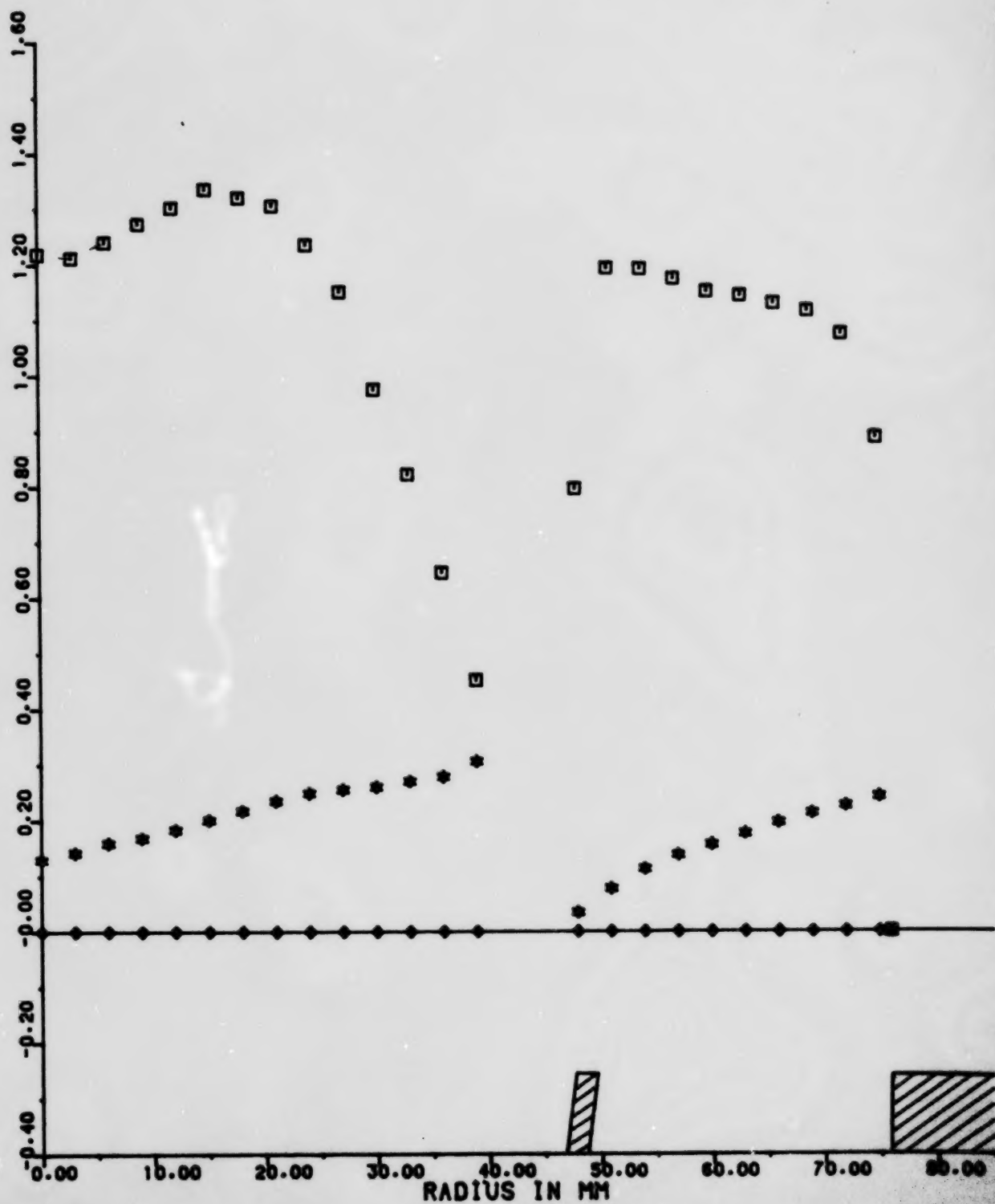


Fig. 3.3:

EXPERIMENT NO. S05H1

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- * RADIAL VELOCITY/VREF

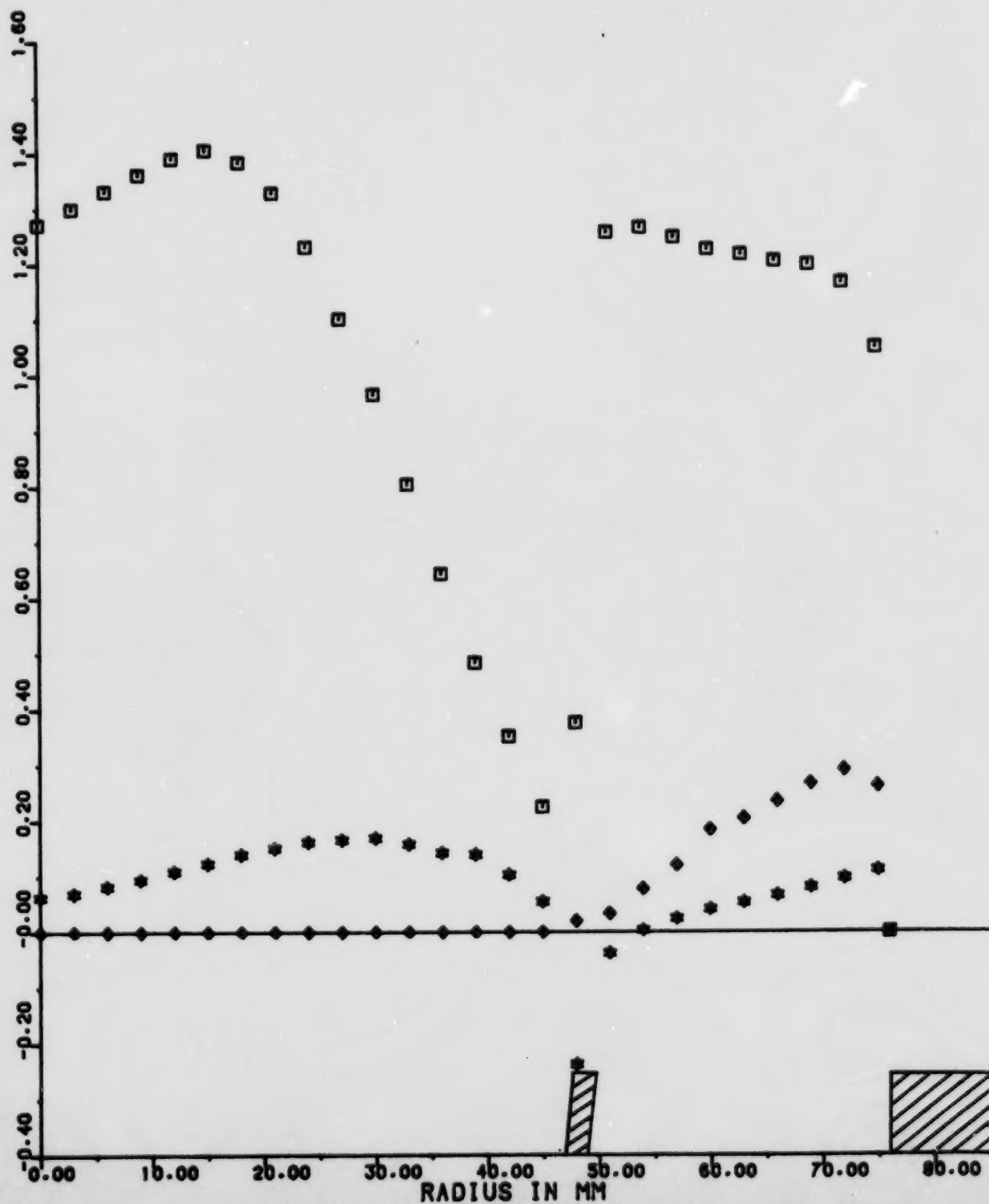


Fig. 3.4:

EXPERIMENT NO. S05L2

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- ★ RADIAL VELOCITY/VREF

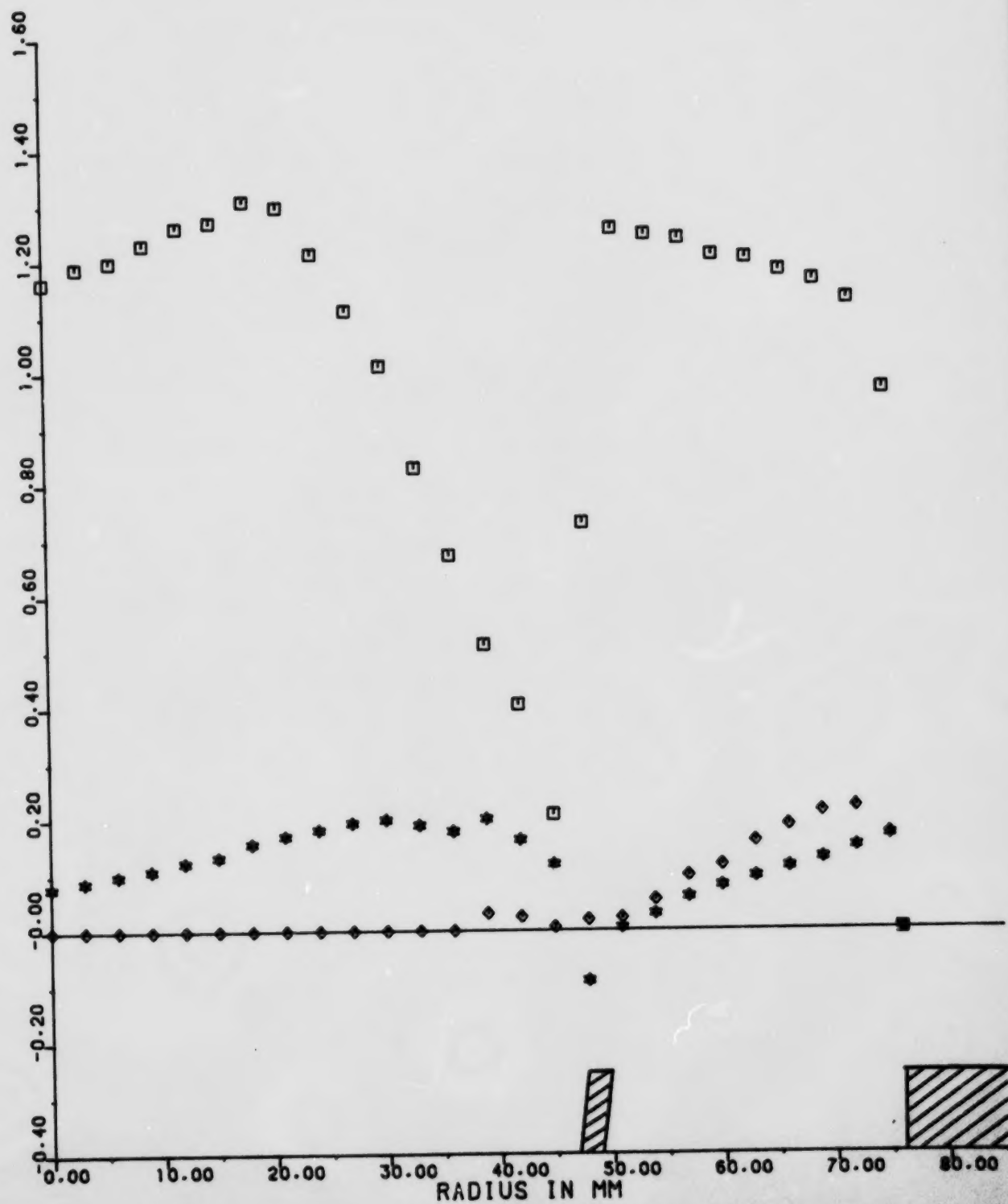


Fig. 3.5:

EXPERIMENT NO. S10H1

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- ★ RADIAL VELOCITY/VREF

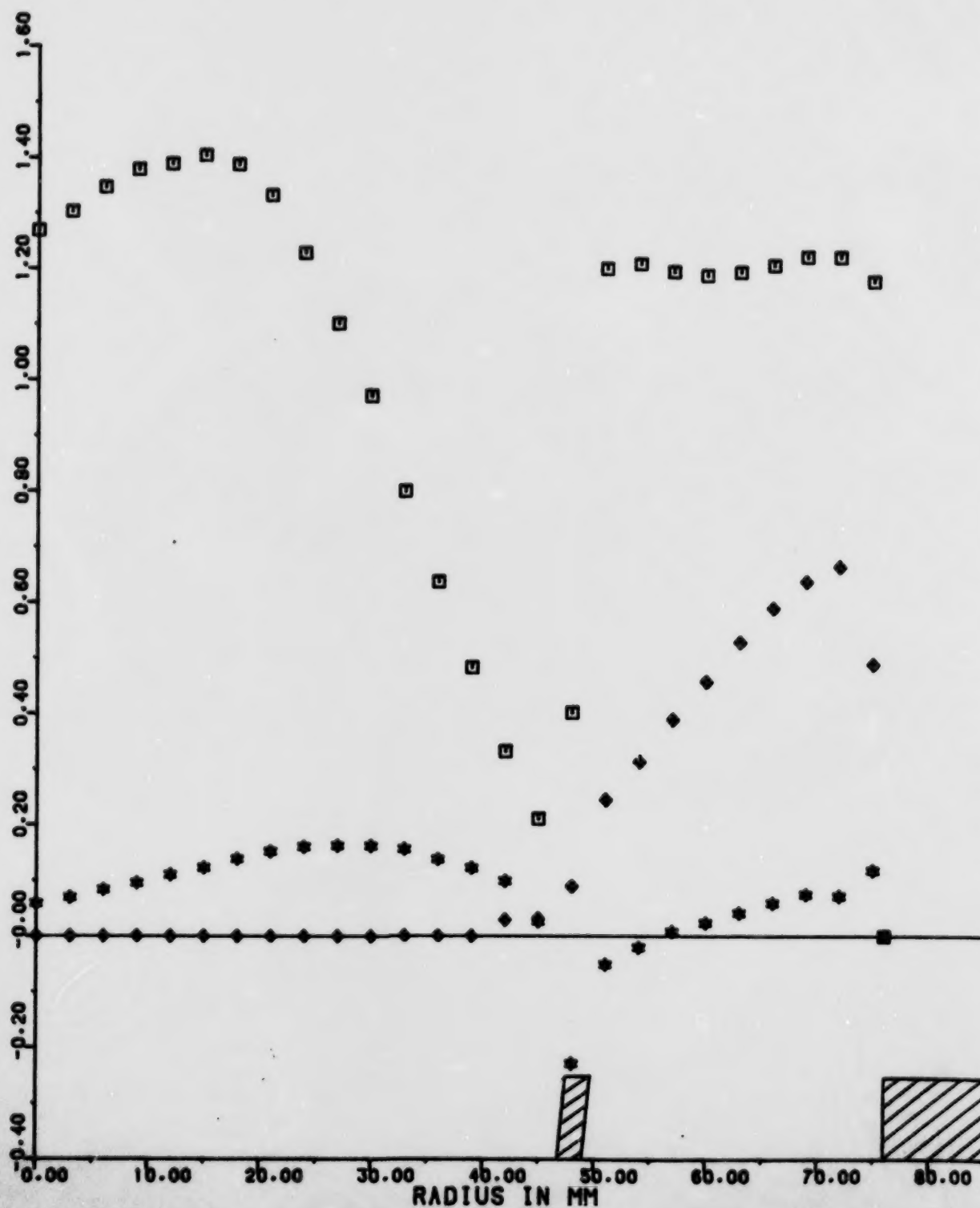


Fig. 3.6:

EXPERIMENT NO. S10L2

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- ★ RADIAL VELOCITY/VREF

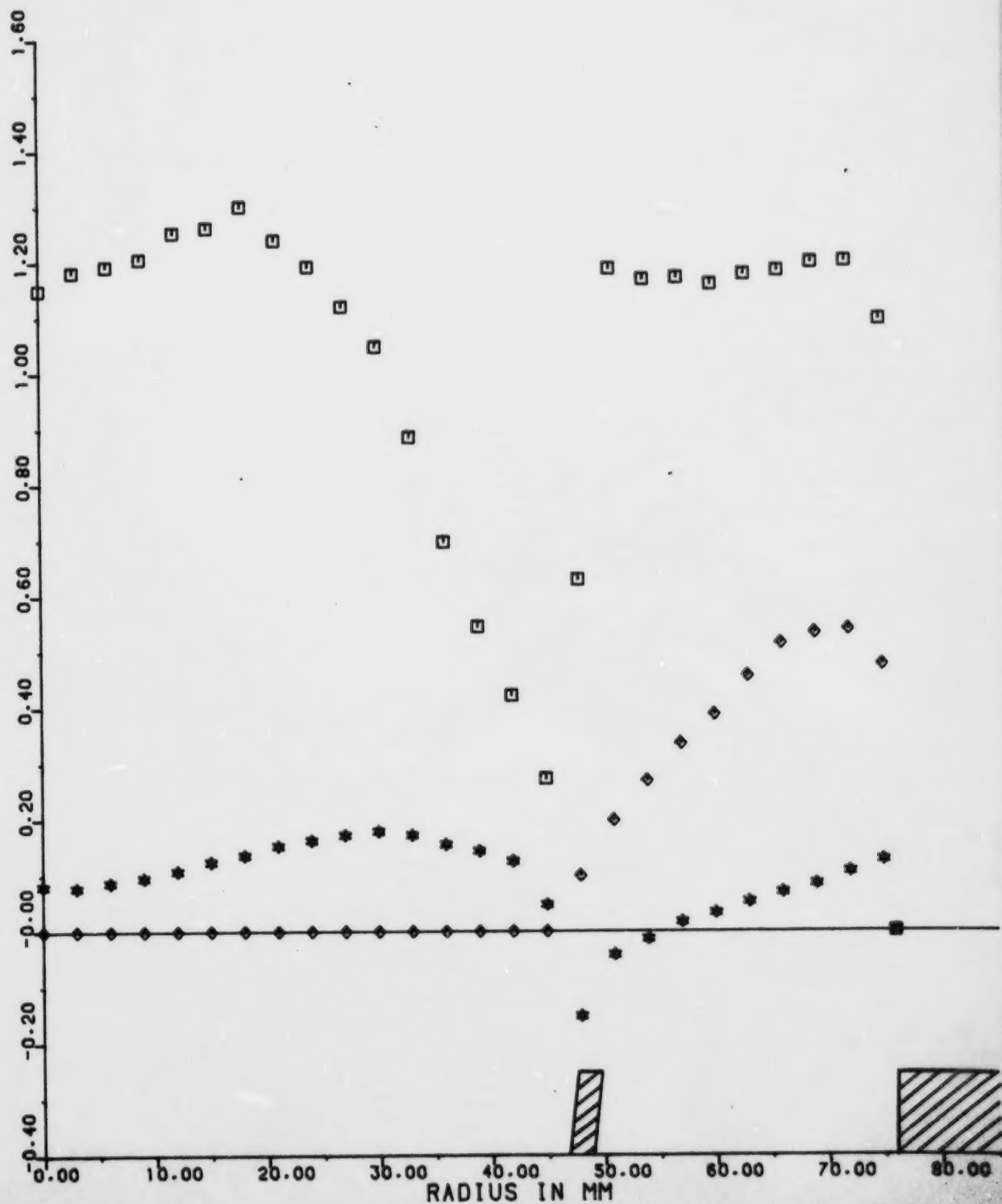


Fig. 3.7:

EXPERIMENT NO. S20H1

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- ★ RADIAL VELOCITY/VREF

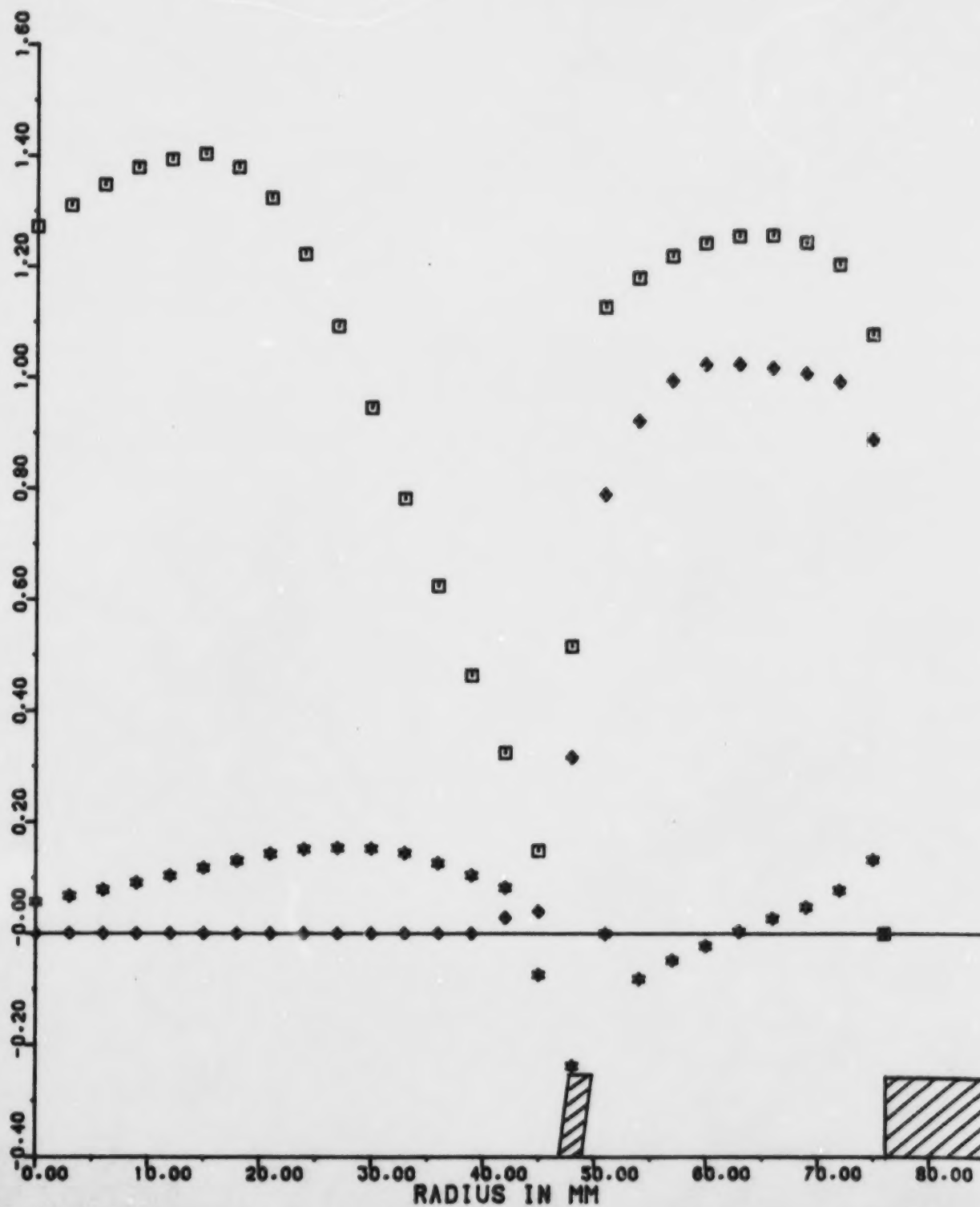


Fig. 3.8:

EXPERIMENT NO. S20L2

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- ★ RADIAL VELOCITY/VREF

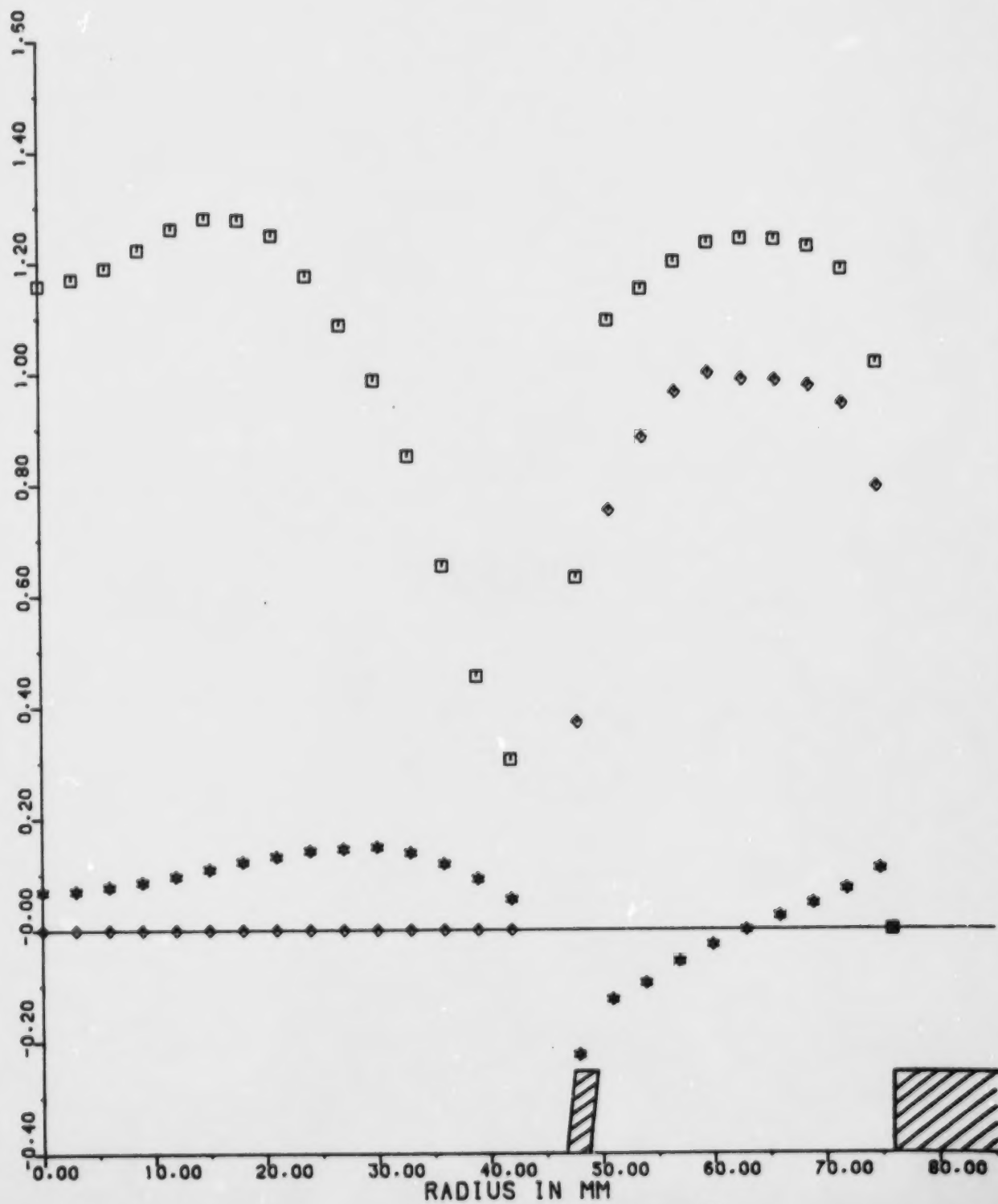


Fig. 3.9:

EXPERIMENT NO. S30H1

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- ★ RADIAL VELOCITY/VREF

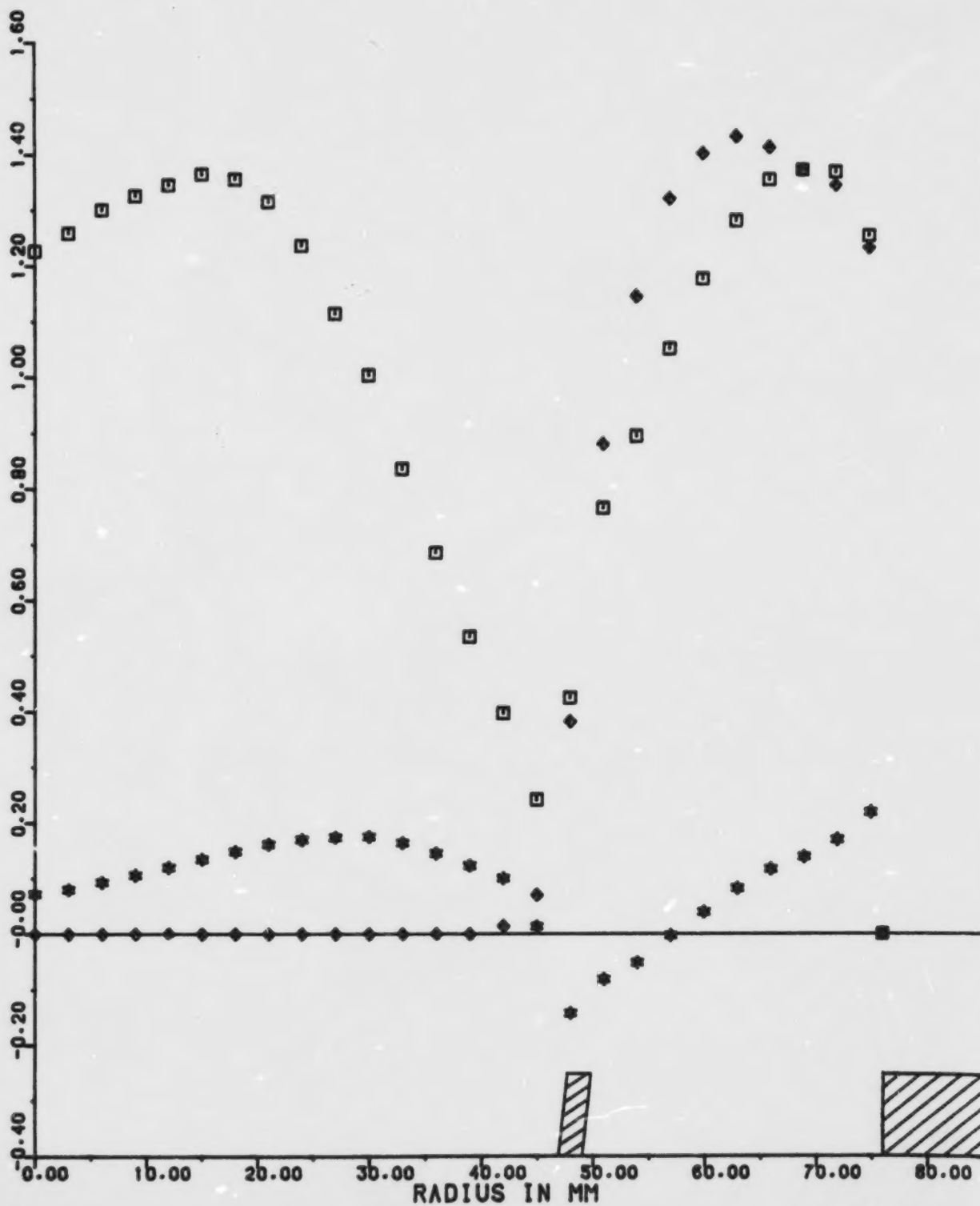


Fig. 3.10:

EXPERIMENT NO. S30L1

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- ★ RADIAL VEL CITY/VREF

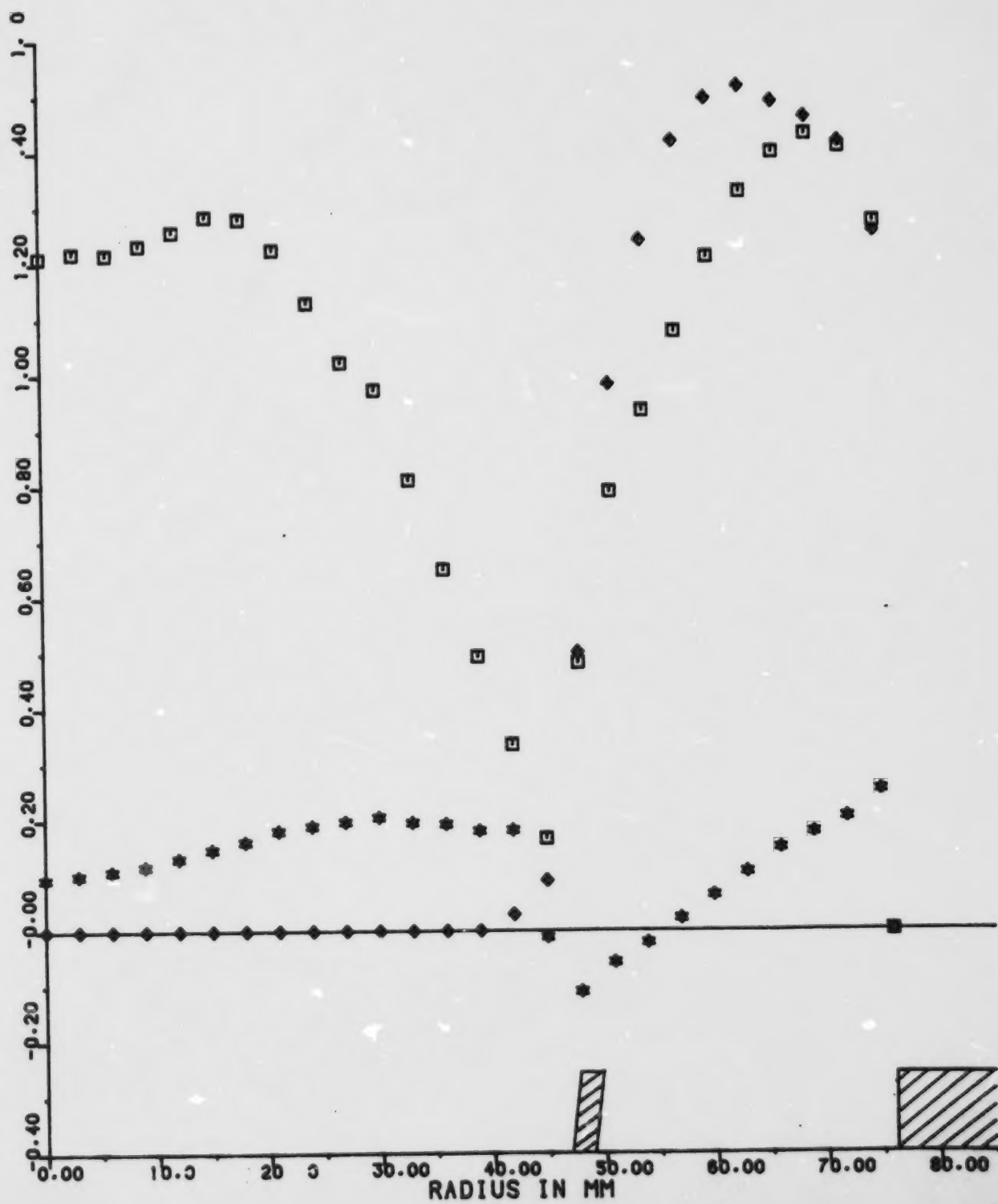


Fig. 3.11:

EXPERIMENT NO. S40H1

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- ★ RADIAL VELOCITY/VREF

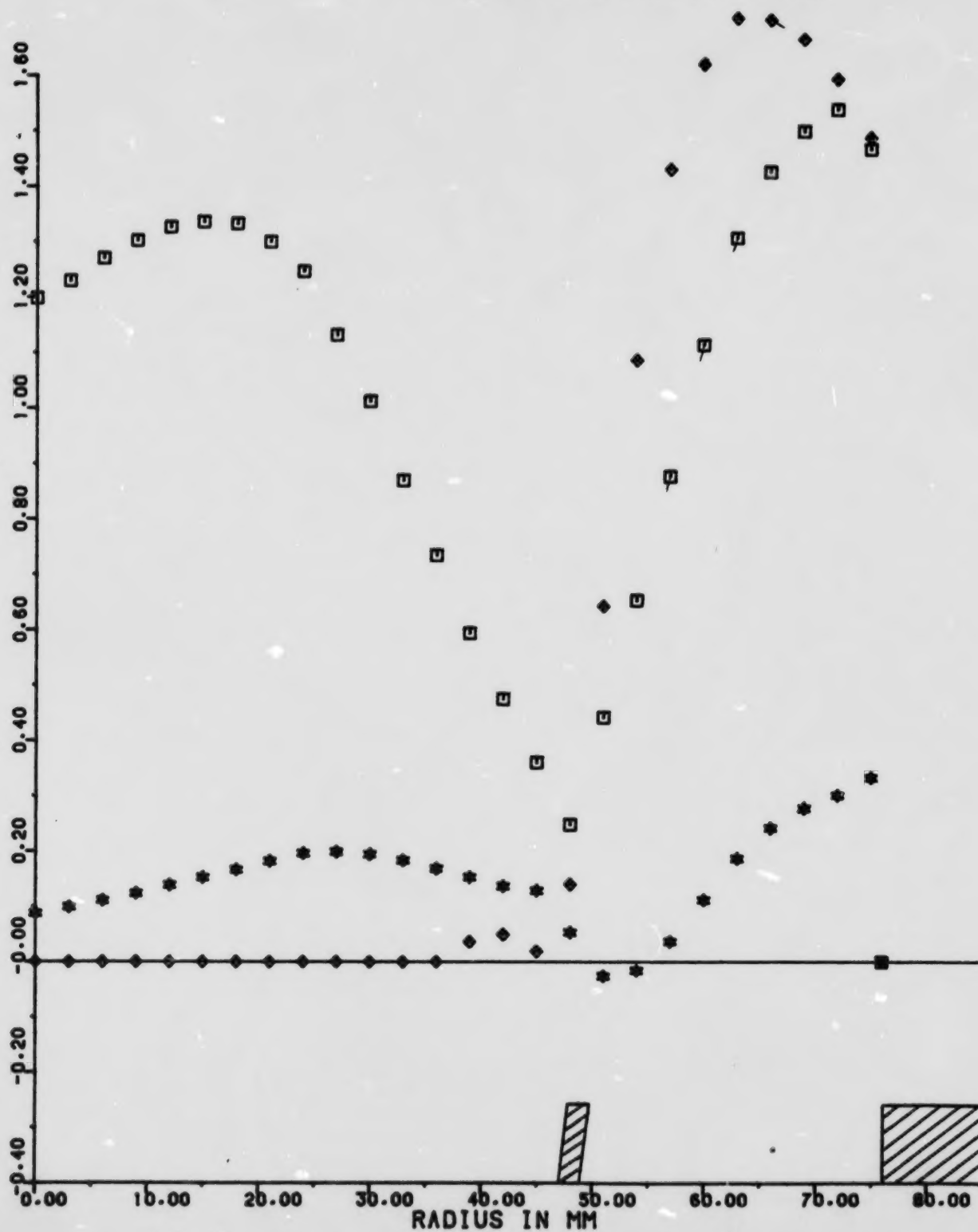


Fig. 3.12:

EXPERIMENT NO. S40L1

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- ★ RADIAL VELOCITY
- EF

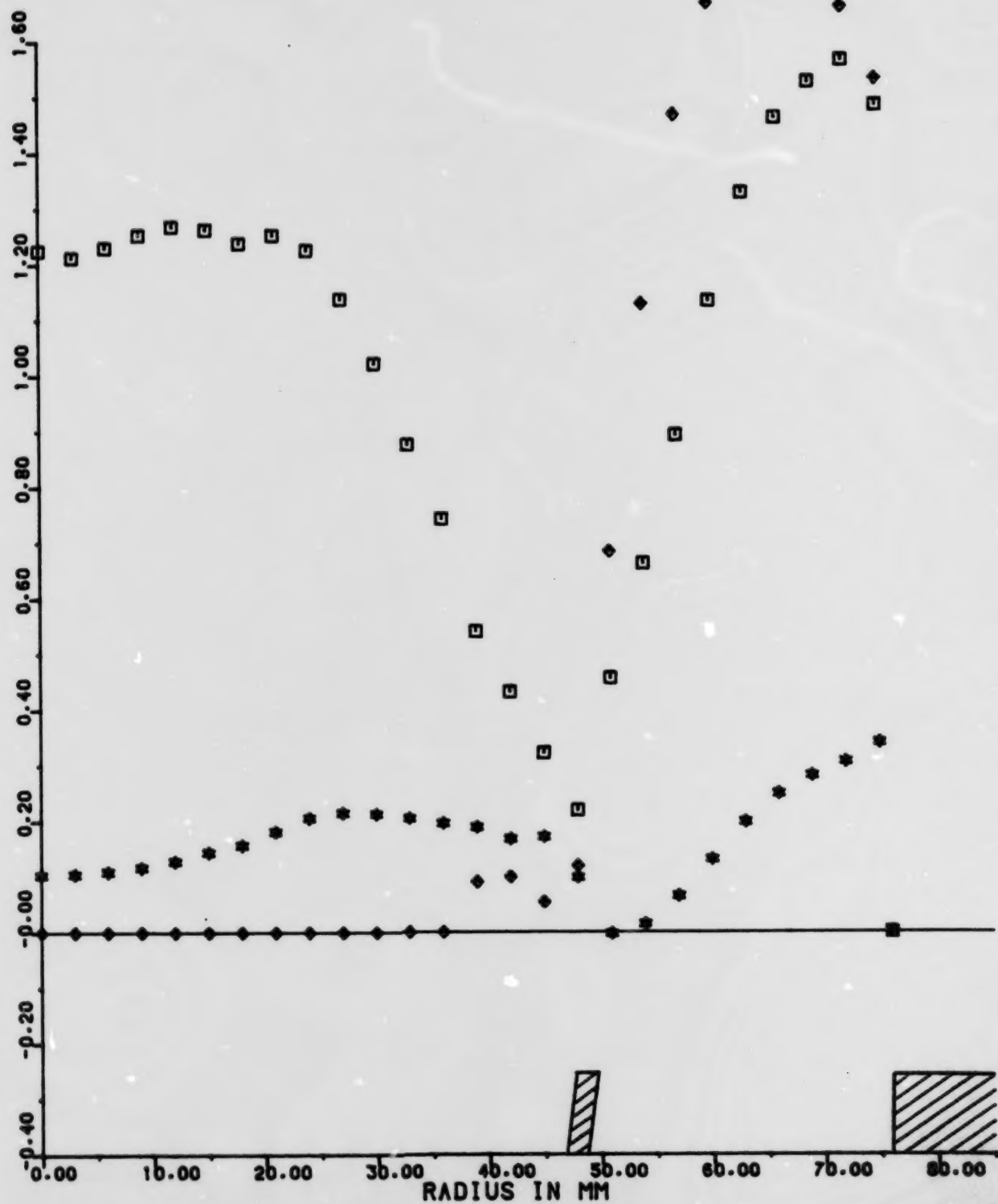


Fig. 3.13:

EXPERIMENT NO. S45H1

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- ★ RADIAL

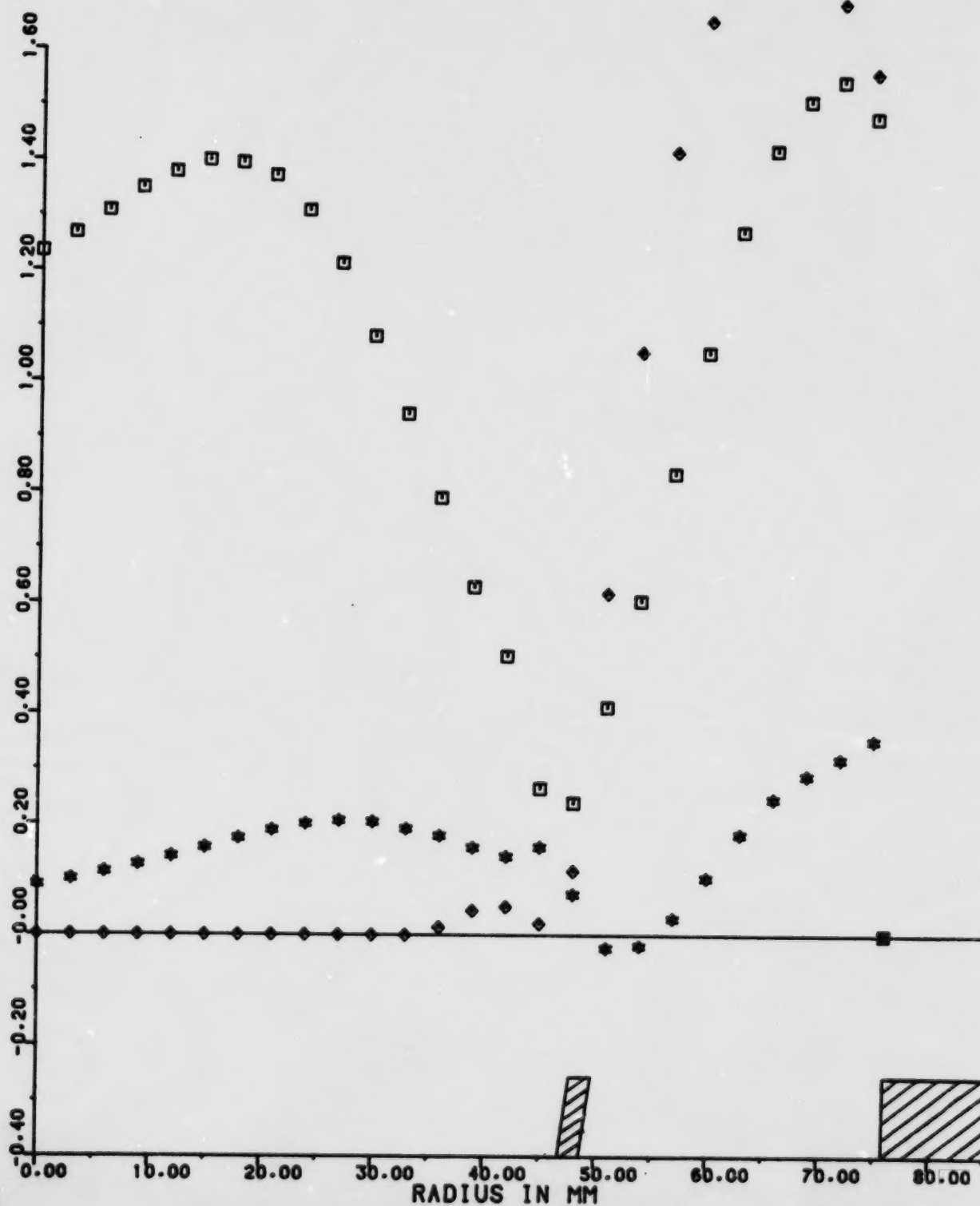


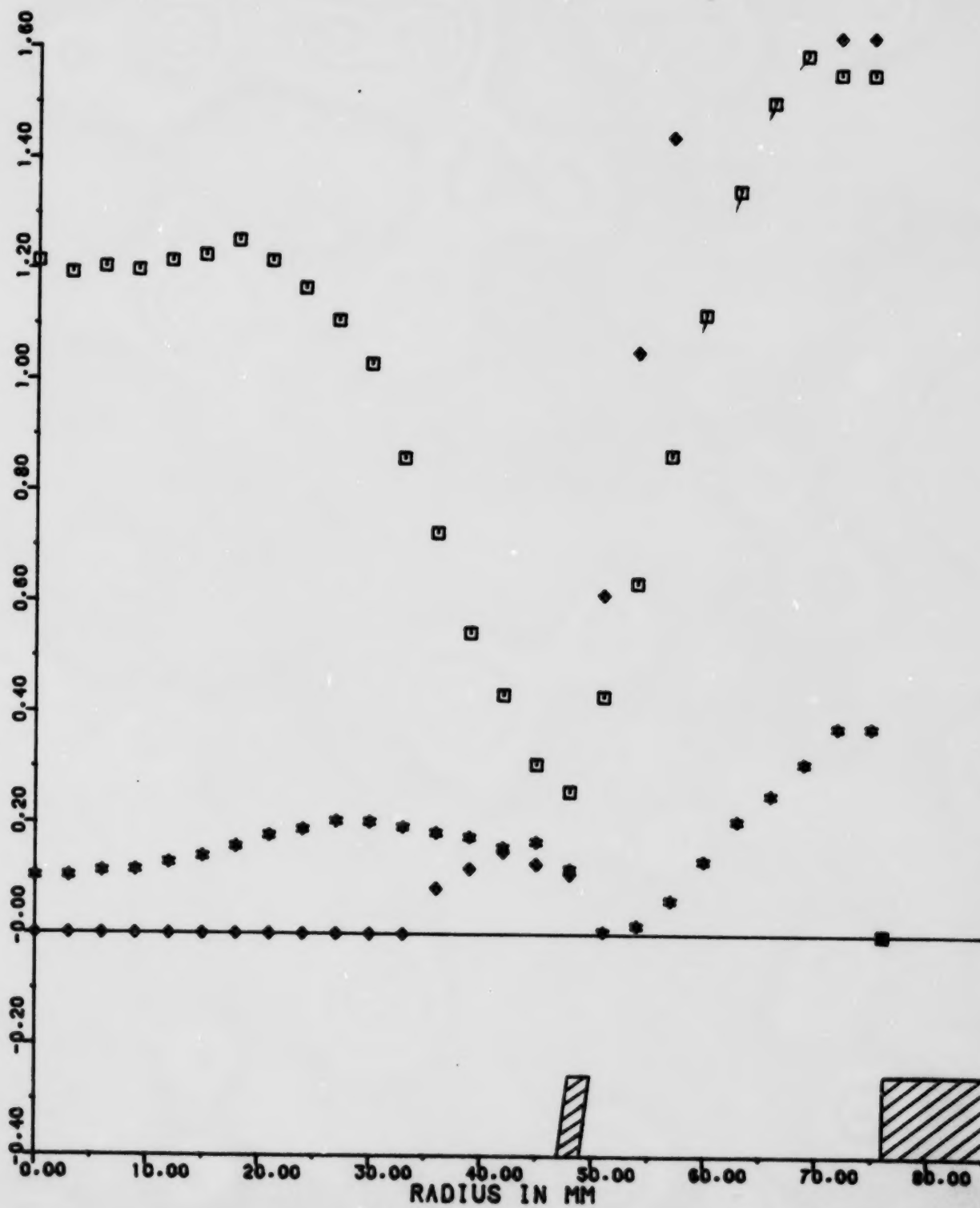
Fig. 3.14:

EXPERIMENT NO. S45L1

□ AXIAL VELOCITY/WREF

◇ TANGENTIAL

★ RADIAL



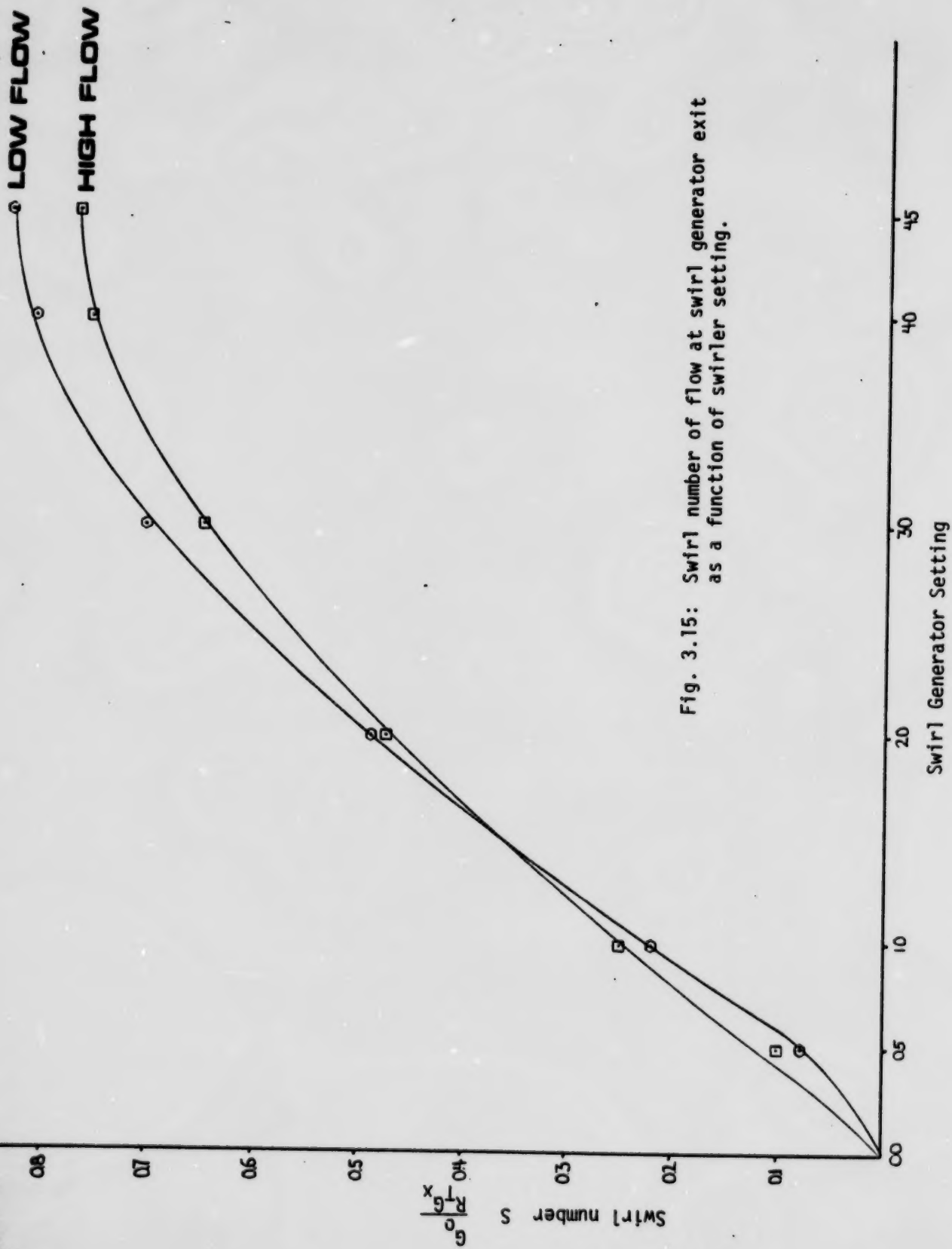


Fig. 3.15: Swirl number of flow at swirl generator exit as a function of swirler setting.

Fig. 3.16:

EXPERIMENT NO. 000H1

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- ★ RADIAL VELOCITY/VREF

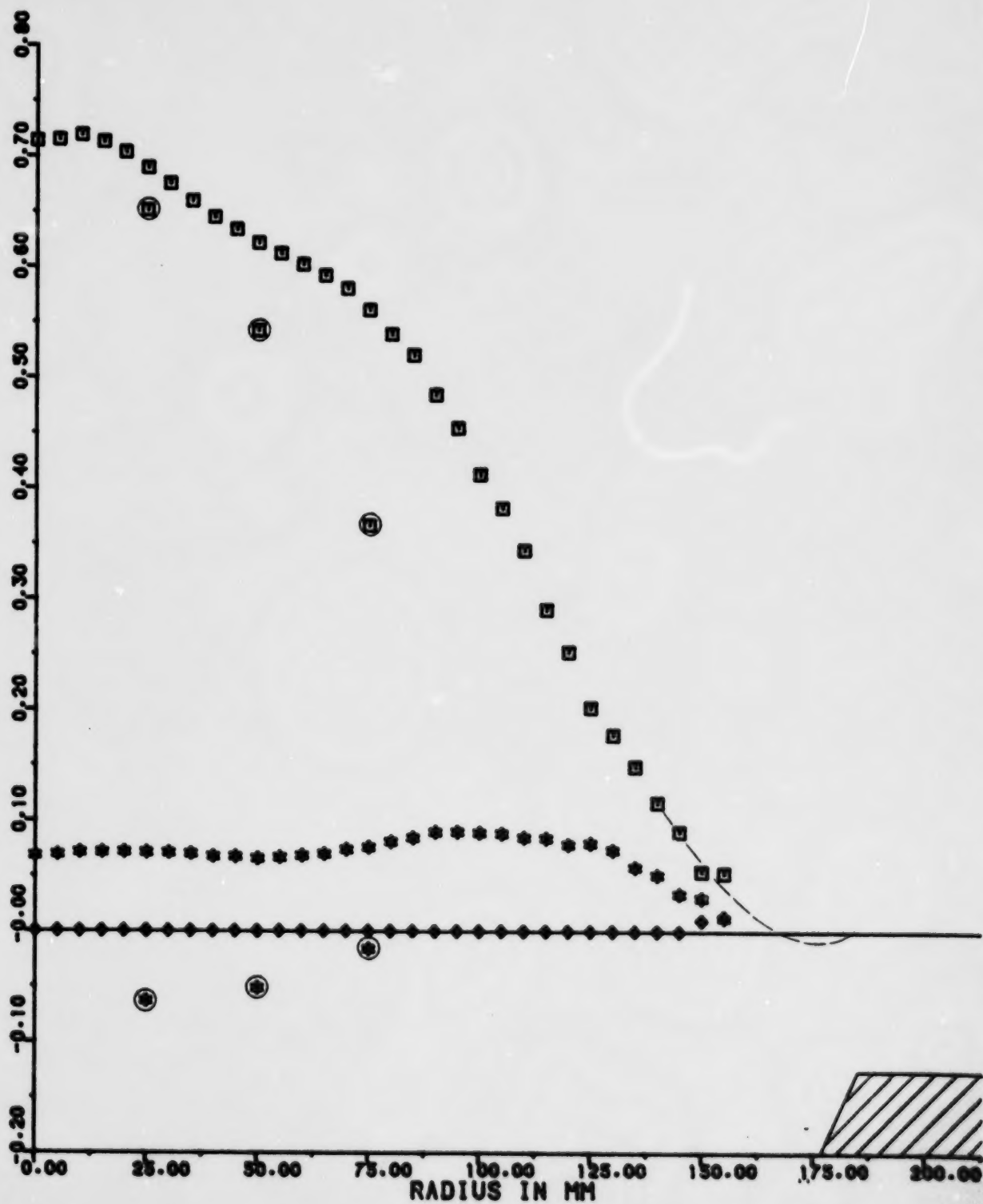


Fig. 3.17:

EXPERIMENT NO. 000L1

- AXIAL VELOCITY/VREF
- ◆ TANGENTIAL VELOCITY/VREF
- ★ RADIAL VELOCITY/VREF

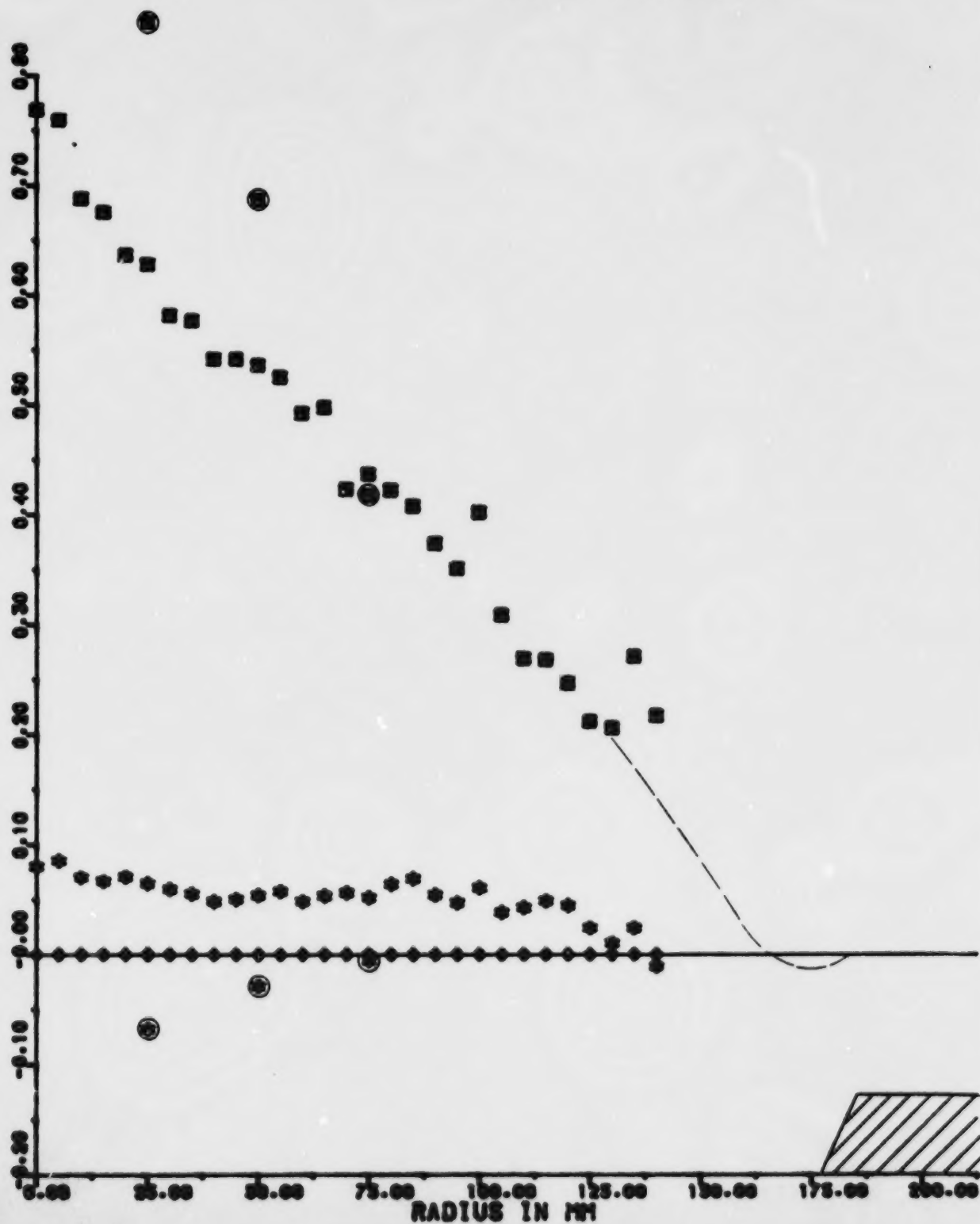


Fig. 3.18:

EXPERIMENT NO. Q05H1

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- ★ RADIAL VELOCITY/VREF

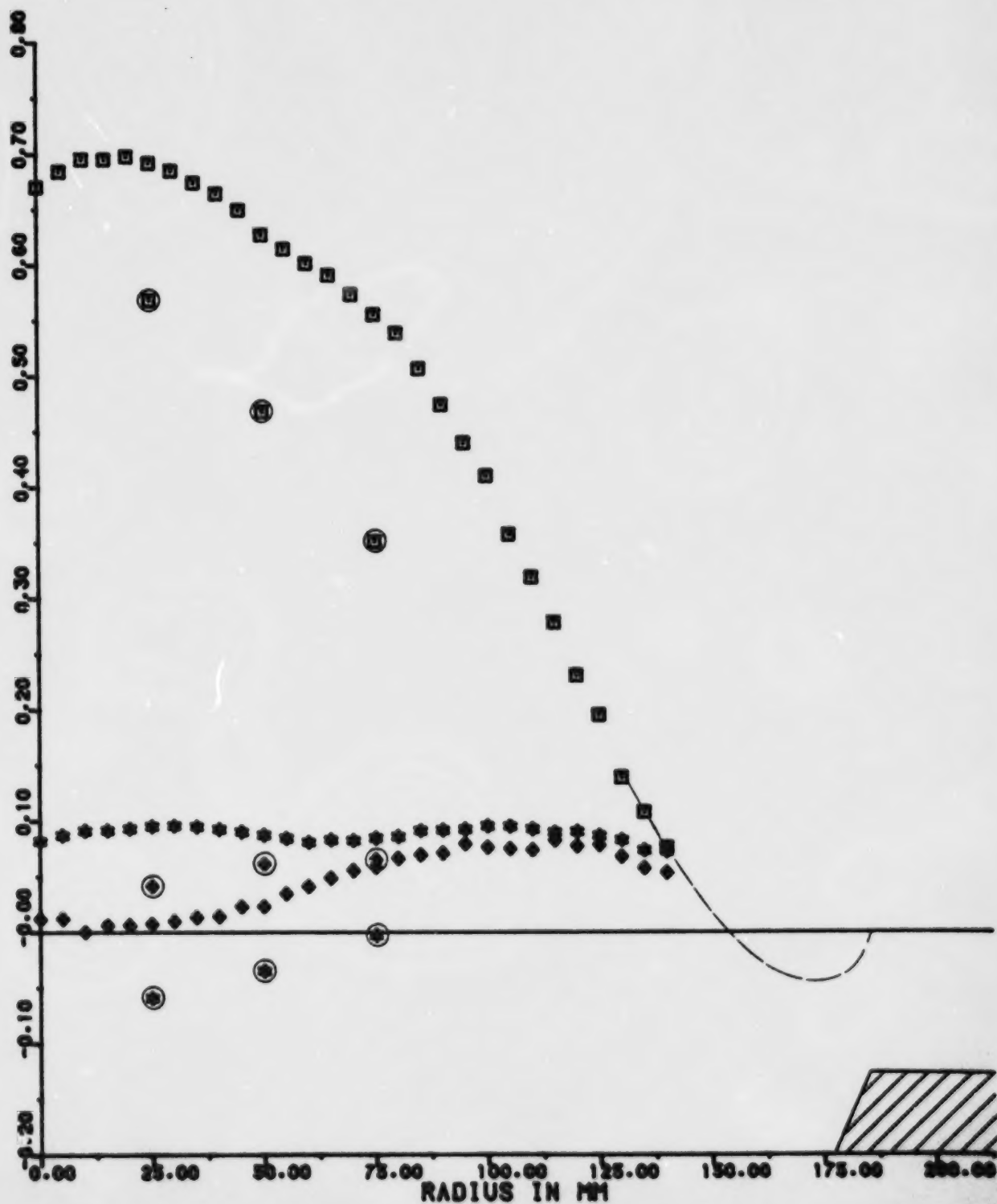


Fig. 3.19:

EXPERIMENT NO. 005L1

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- * RADIAL VELOCITY/VREF

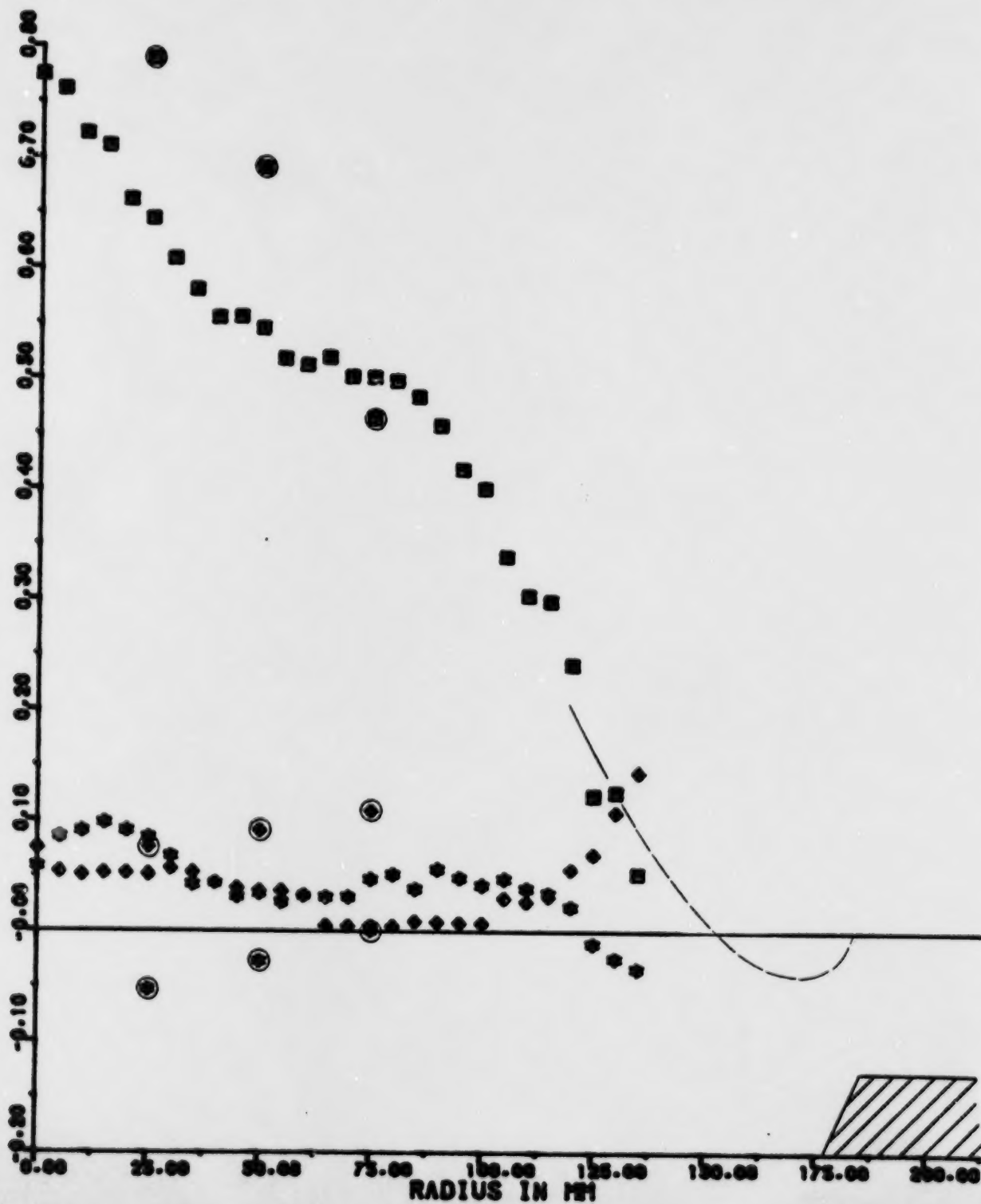


Fig. 3.20:

EXPERIMENT NO. Q10H1

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- * RADIAL VELOCITY/VREF

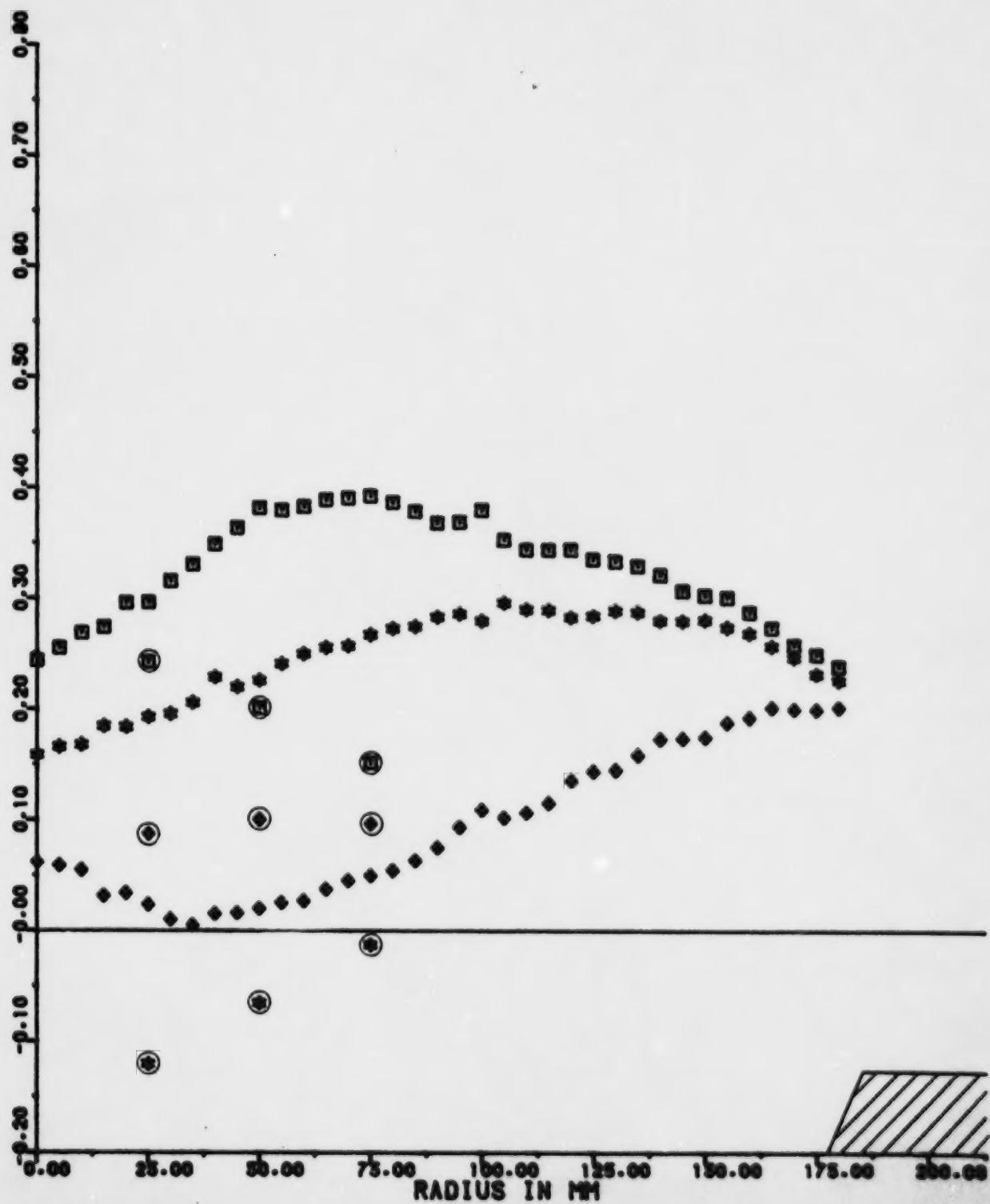


Fig. 3.21:

EXPERIMENT NO. Q20H1

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- * RADIAL VELOCITY/VREF

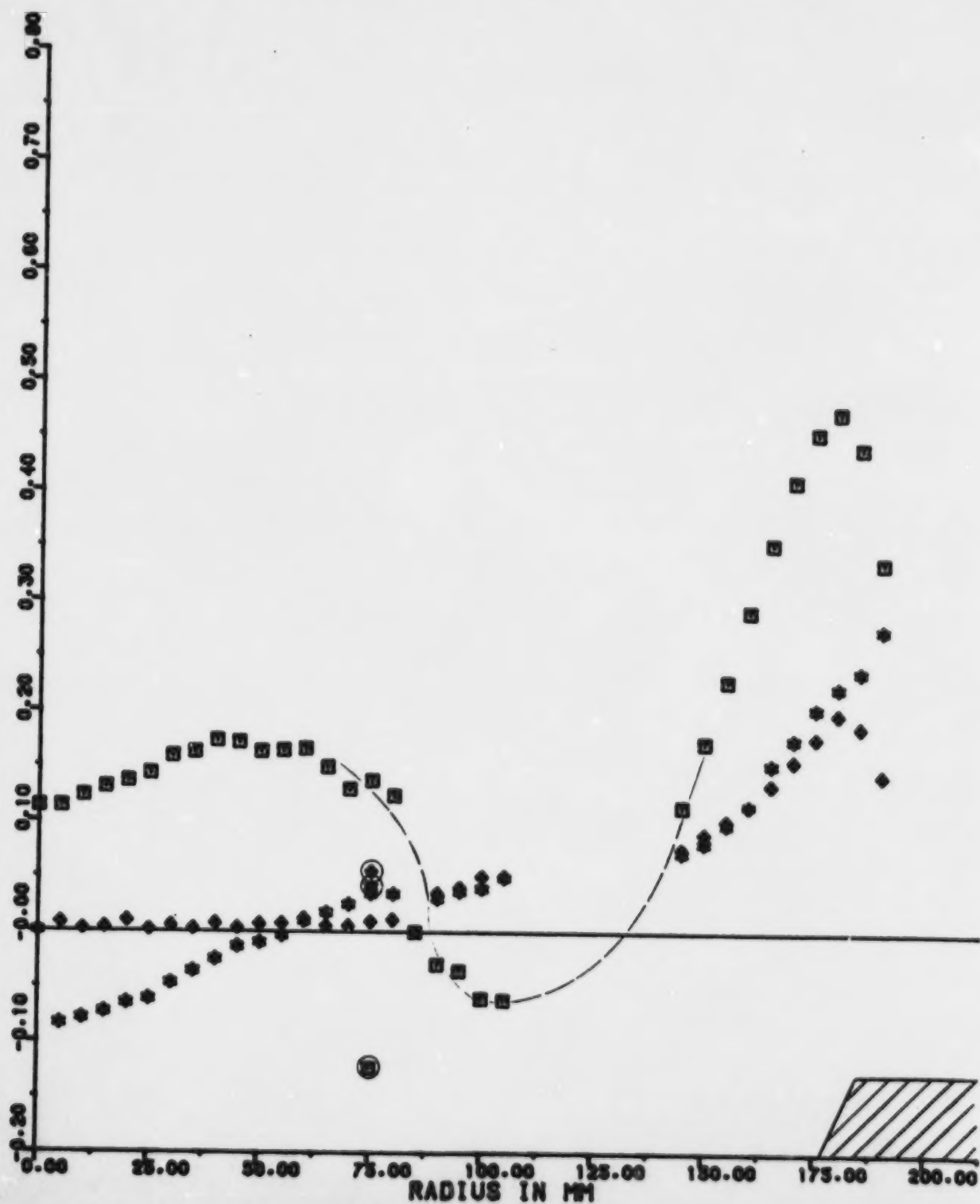


Fig. 3.22:

EXPERIMENT NO. Q20L1

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- * RADIAL VELOCITY/VREF

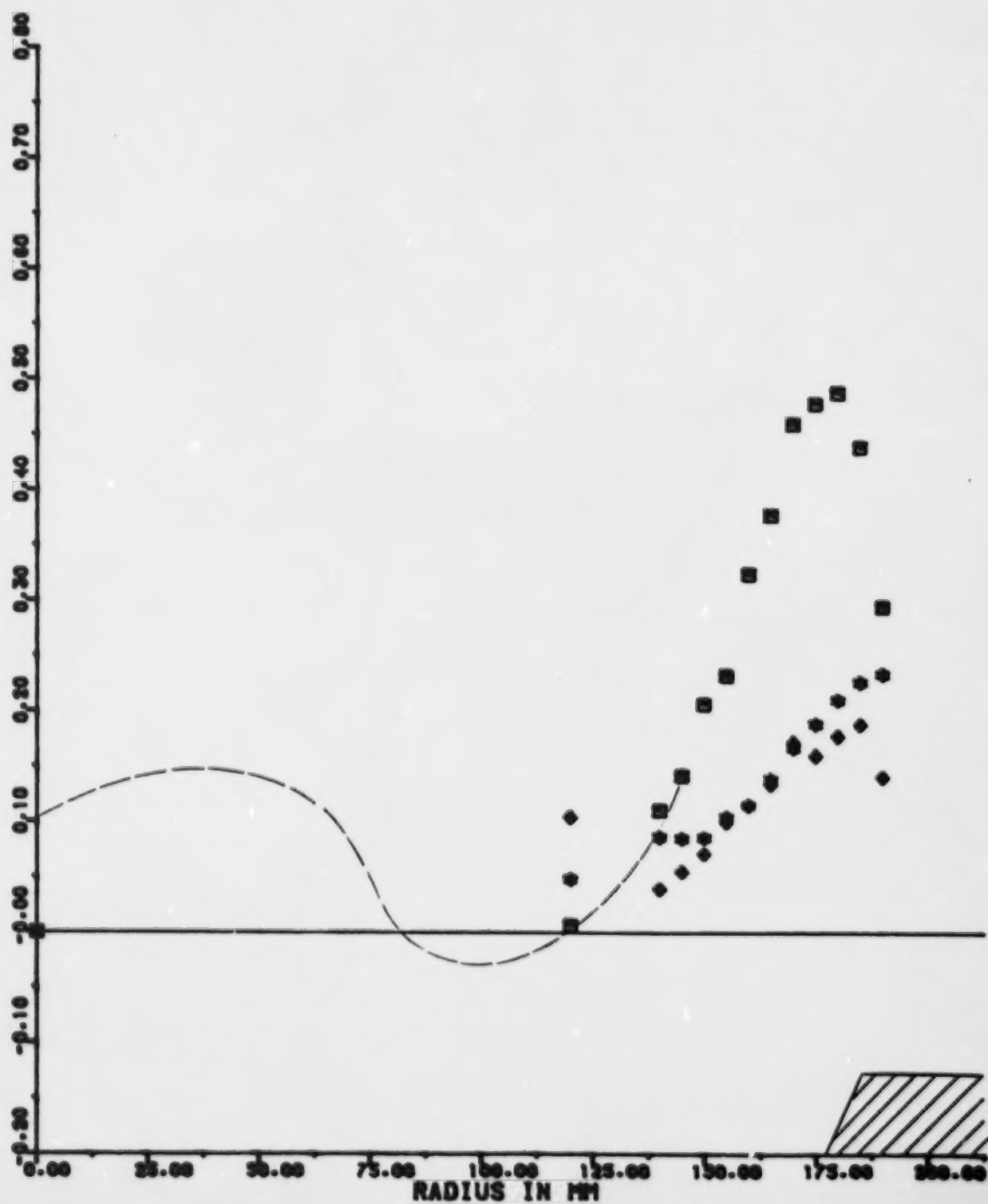


Fig. 3.23:

EXPERIMENT NO. Q30H1

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- ★ RADIAL VELOCITY/VREF

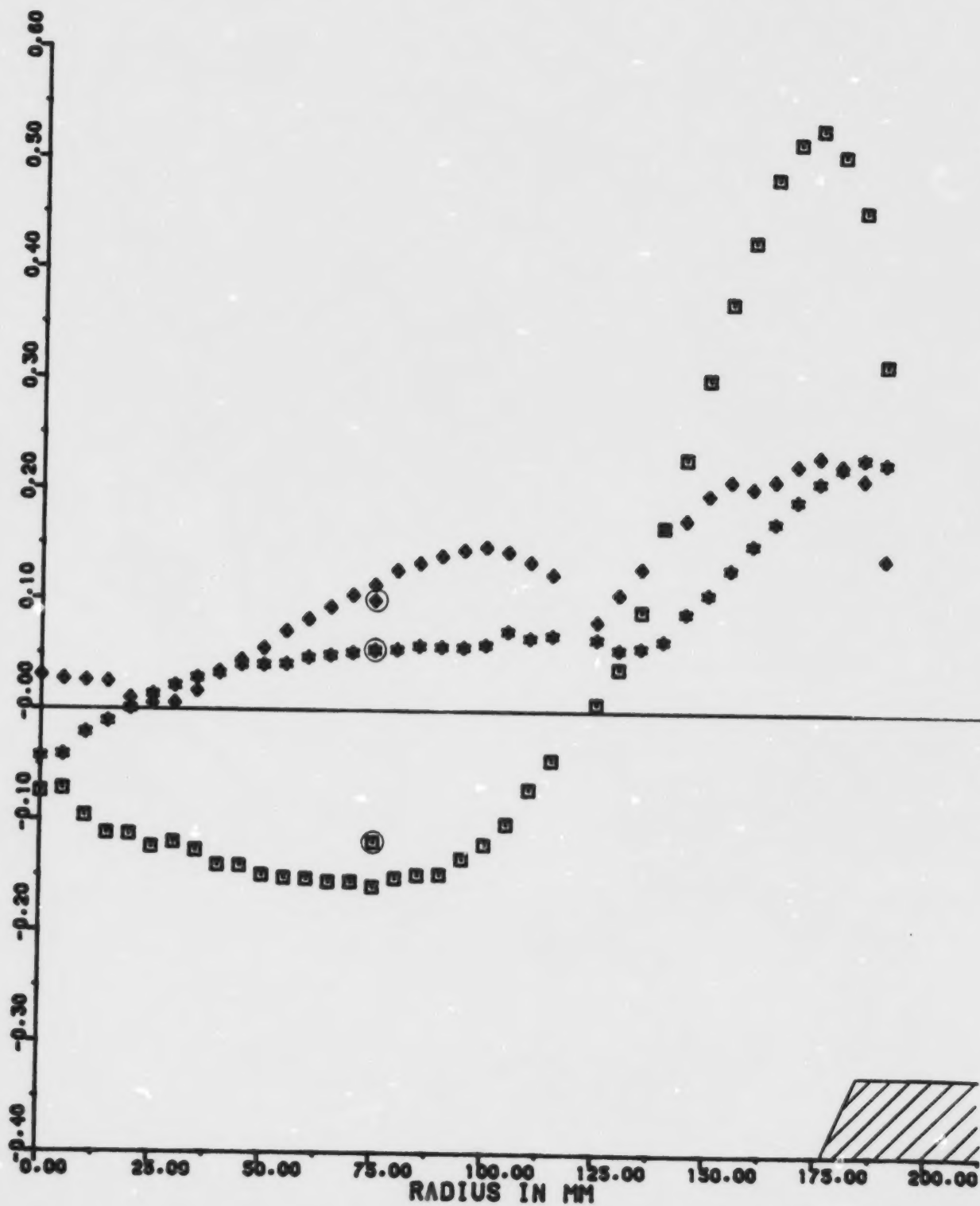


Fig. 3.24:

EXPERIMENT NO. Q30L1

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- * RADIAL VELOCITY/VREF

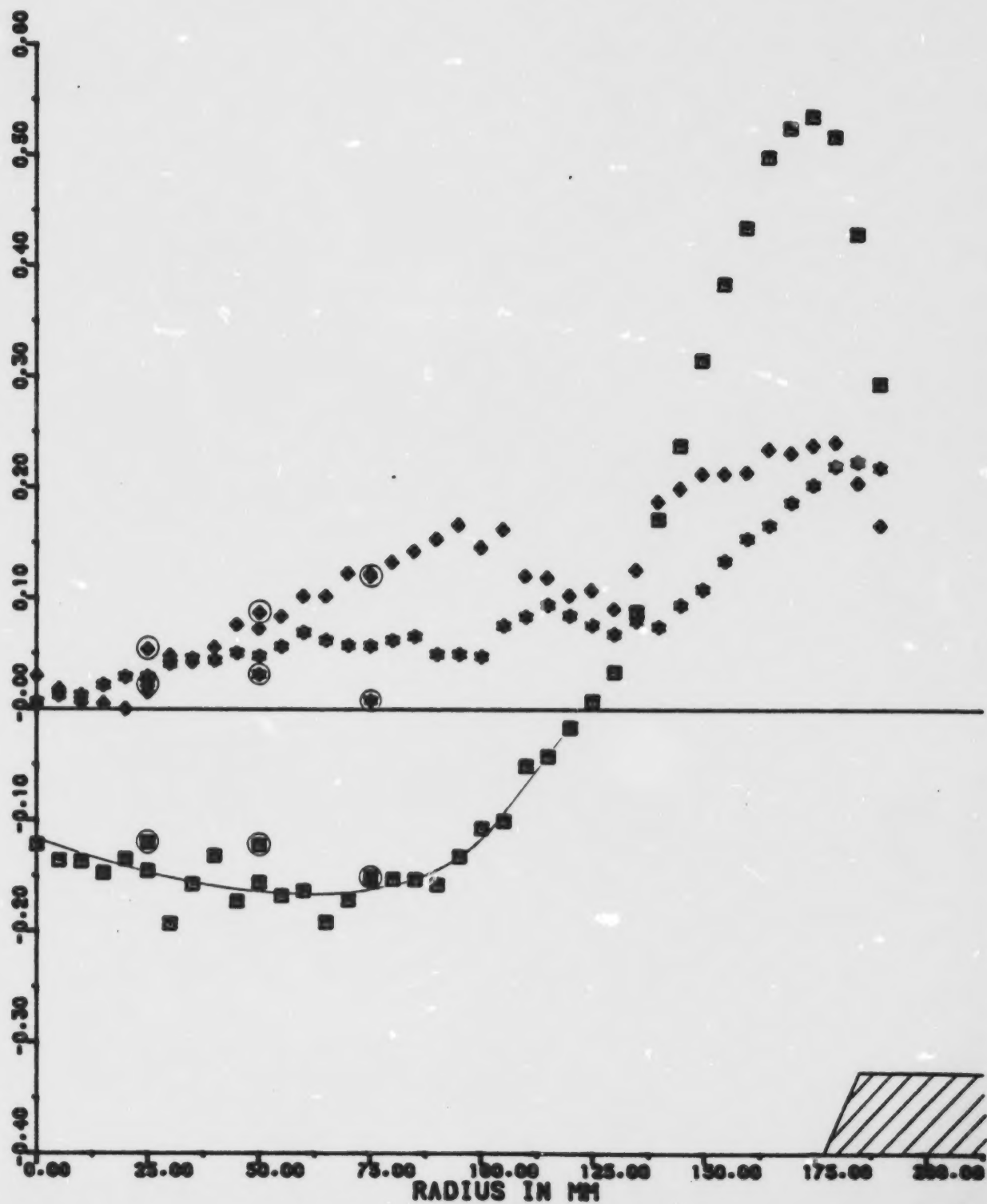


Fig. 3.25:

EXPERIMENT NO. Q40H1

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- * RADIAL VELOCITY/VREF

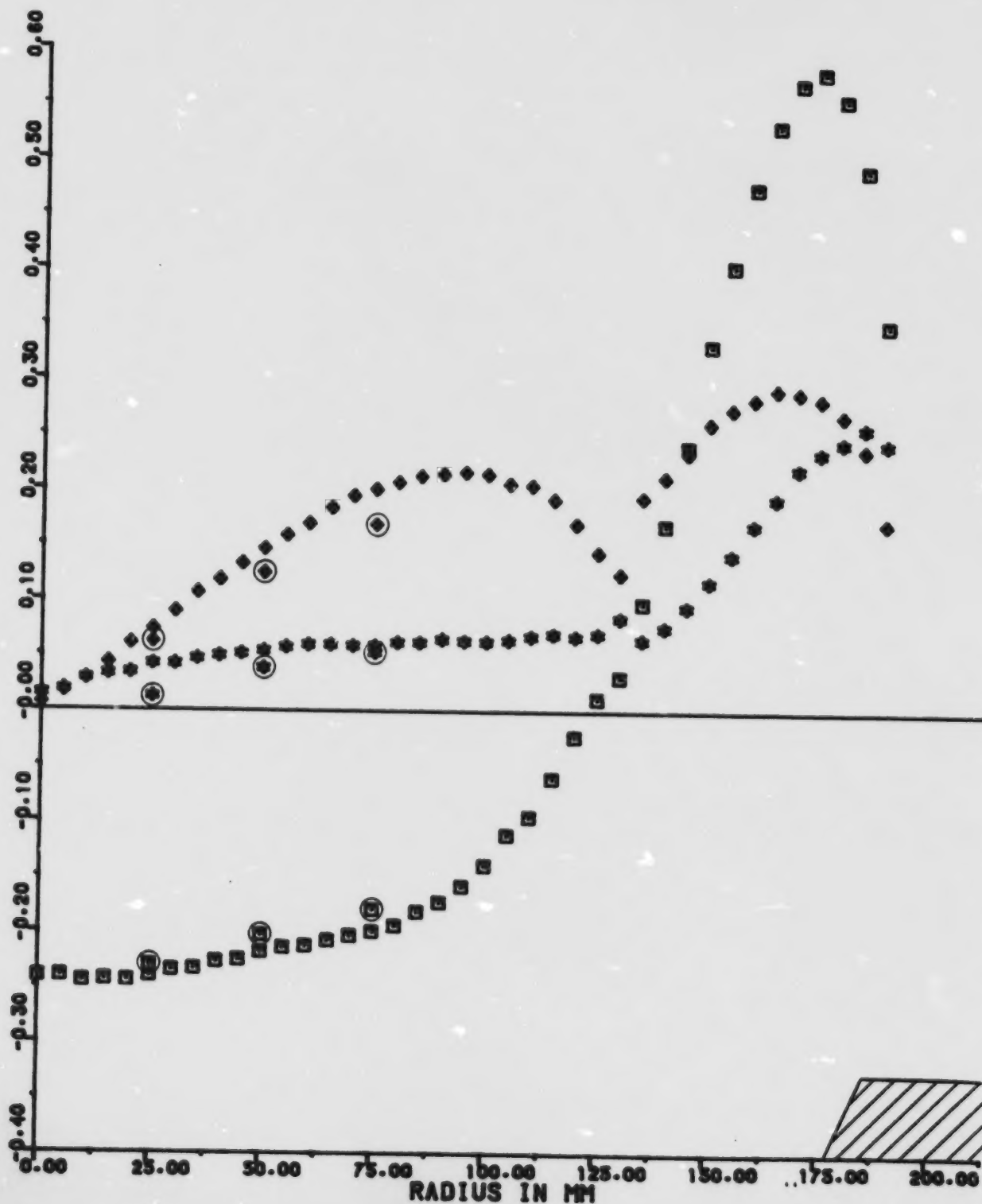


Fig. 3.26:

EXPERIMENT NO. Q40L1

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- * RADIAL VELOCITY/VREF

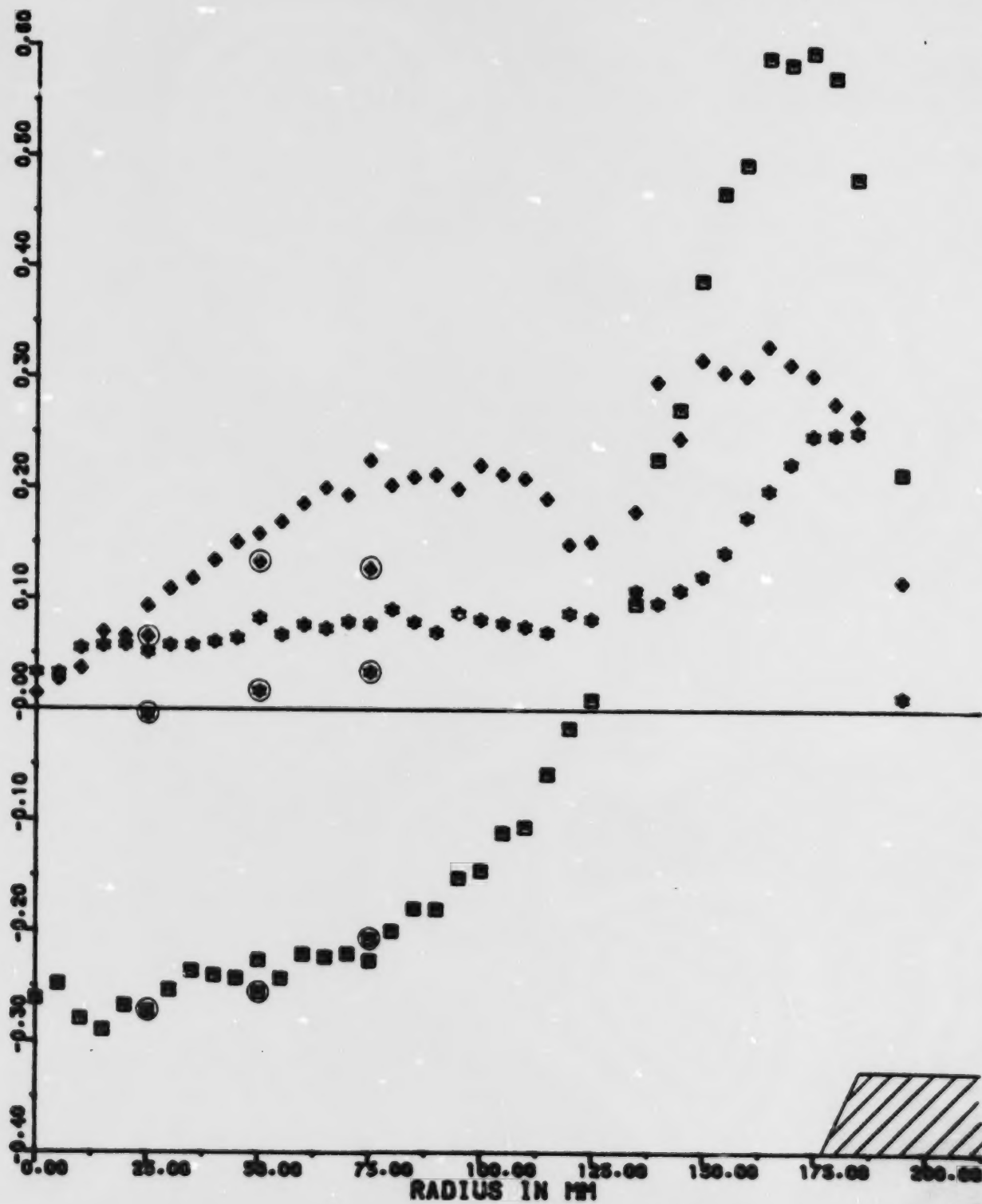


Fig. 3.27:

EXPERIMENT NO. Q45H1

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- ★ RADIAL VELOCITY/VREF

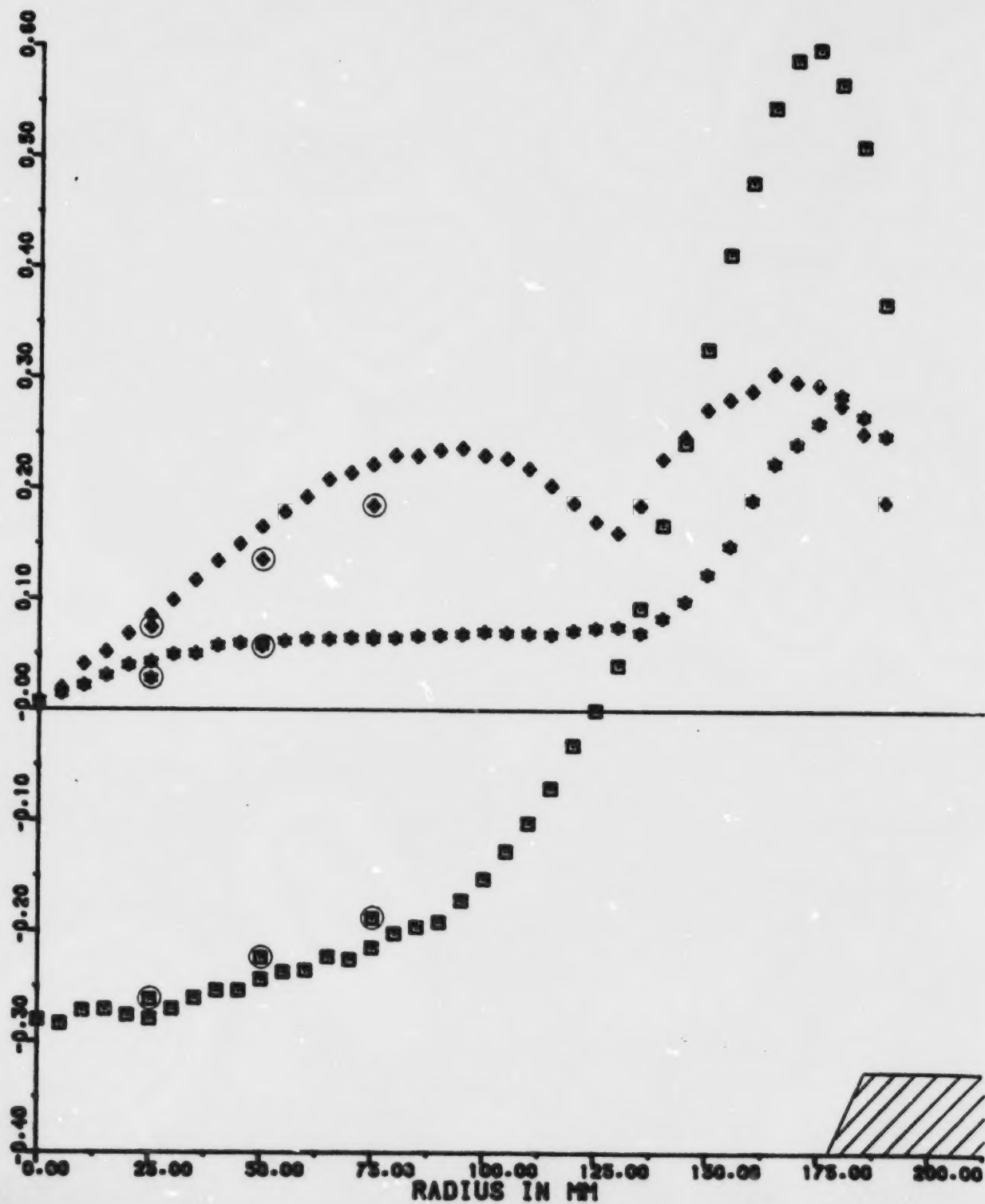
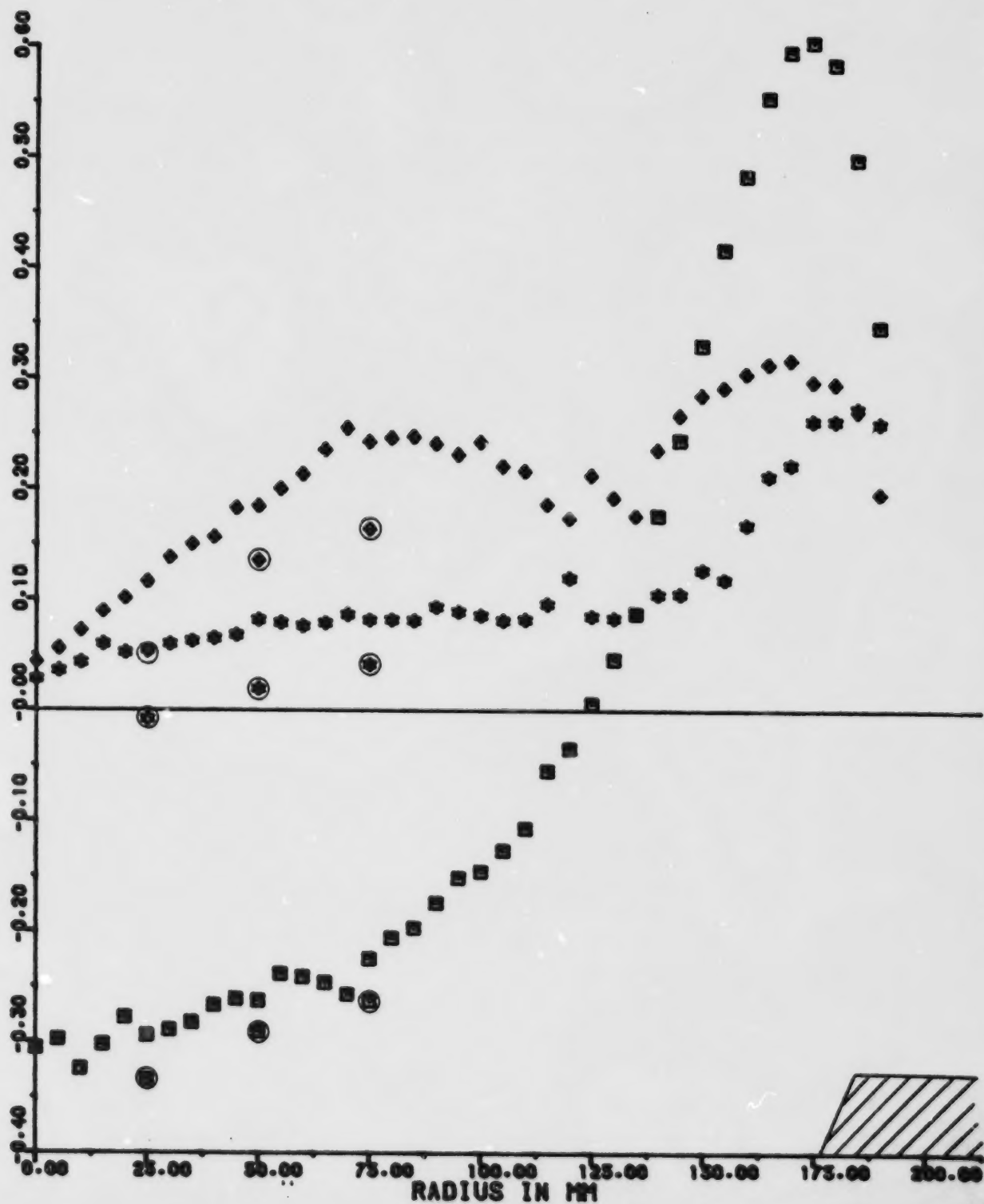
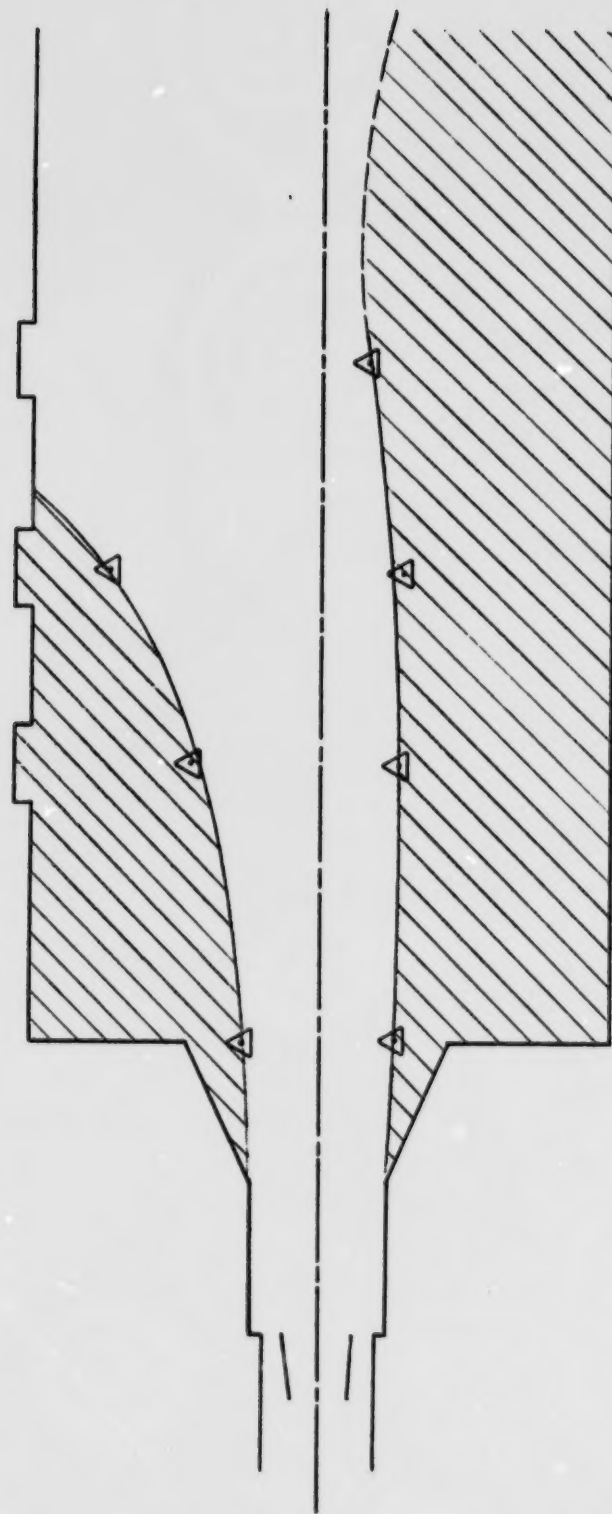


Fig. 3.28:

EXPERIMENT NO. Q45L1

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- ✱ RADIAL VELOCITY/VREF





REVERSED FLOW

Fig. 3.29: Location of backflow region boundaries, swirler setting 0.

Fig. 3.30:

EXPERIMENT NO. 1T00H2

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- * RADIAL VELOCITY/VREF

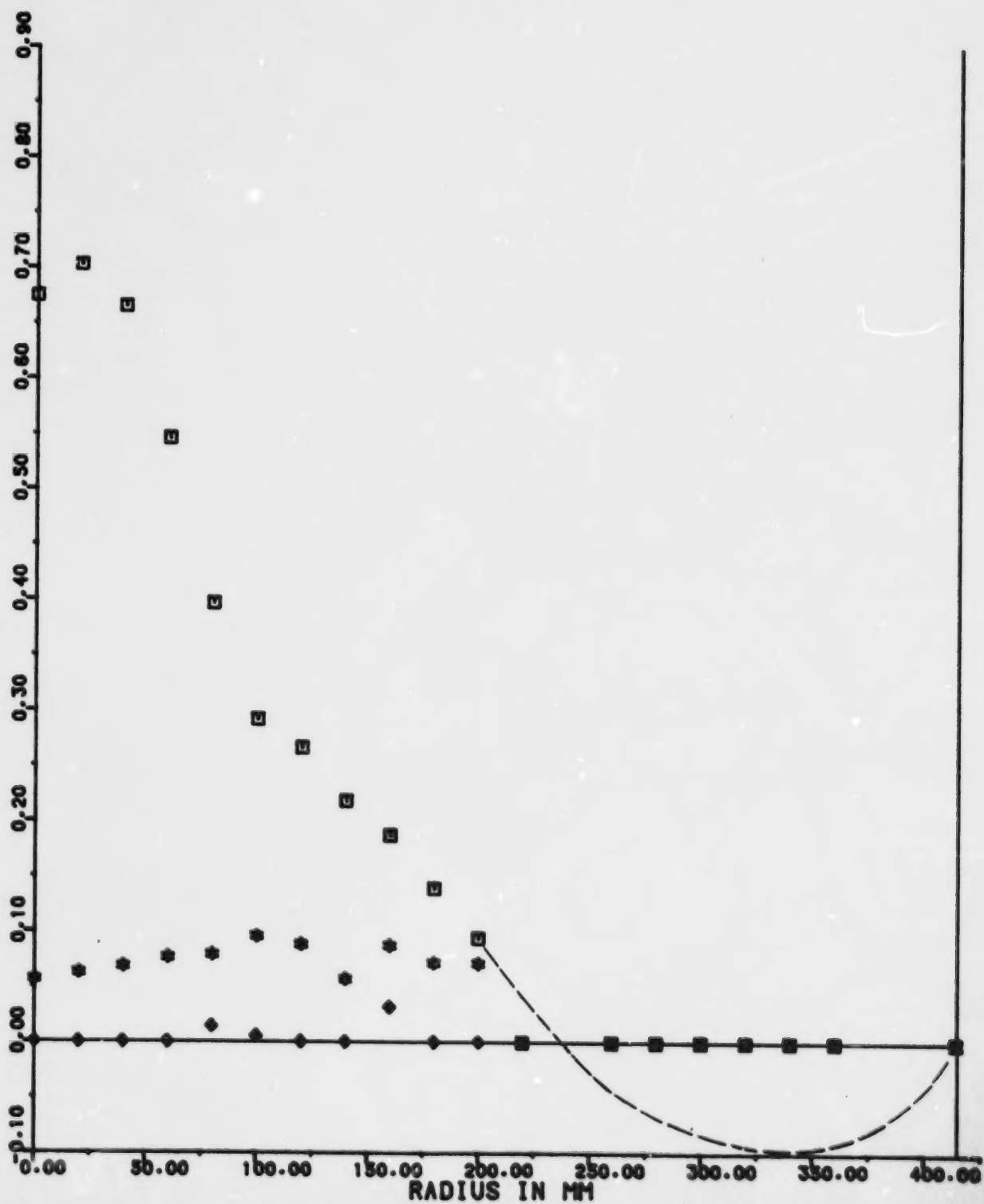


Fig. 3.31:

EXPERIMENT NO. 2T00H2

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- * RADIAL VELOCITY/VREF

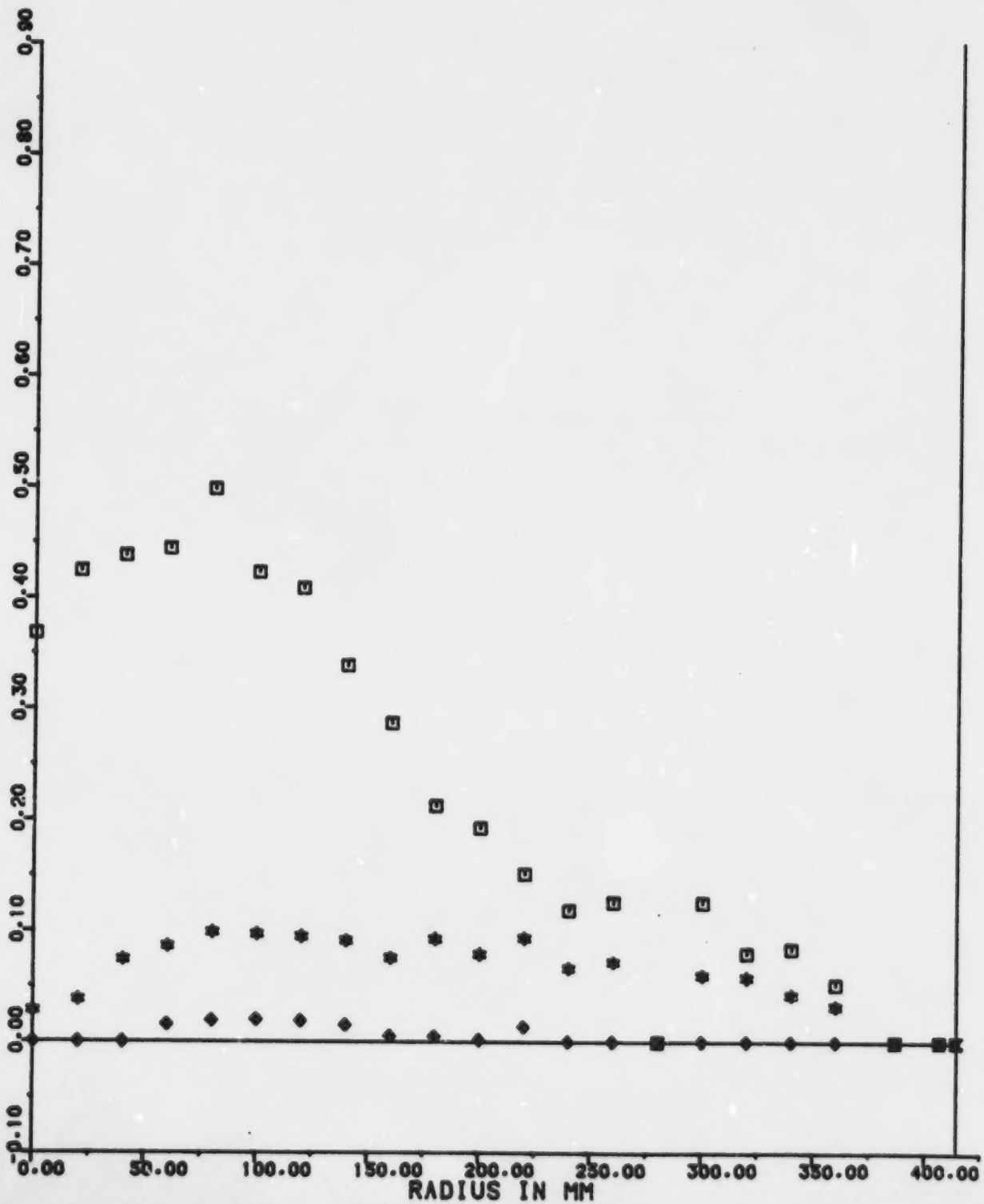
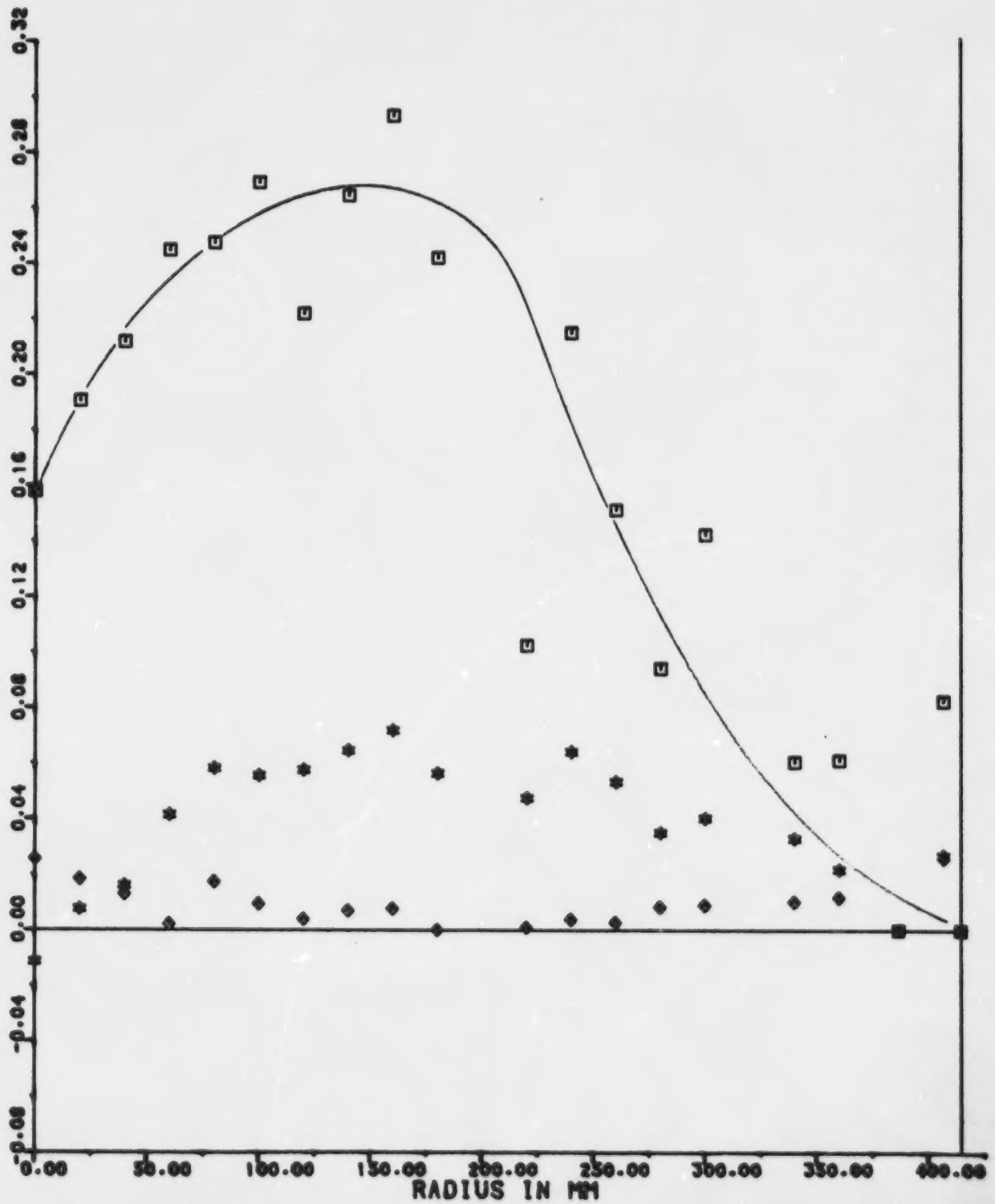


Fig. 3.32:

EXPERIMENT NO. 3T00H1

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- ★ RADIAL VELOCITY/VREF



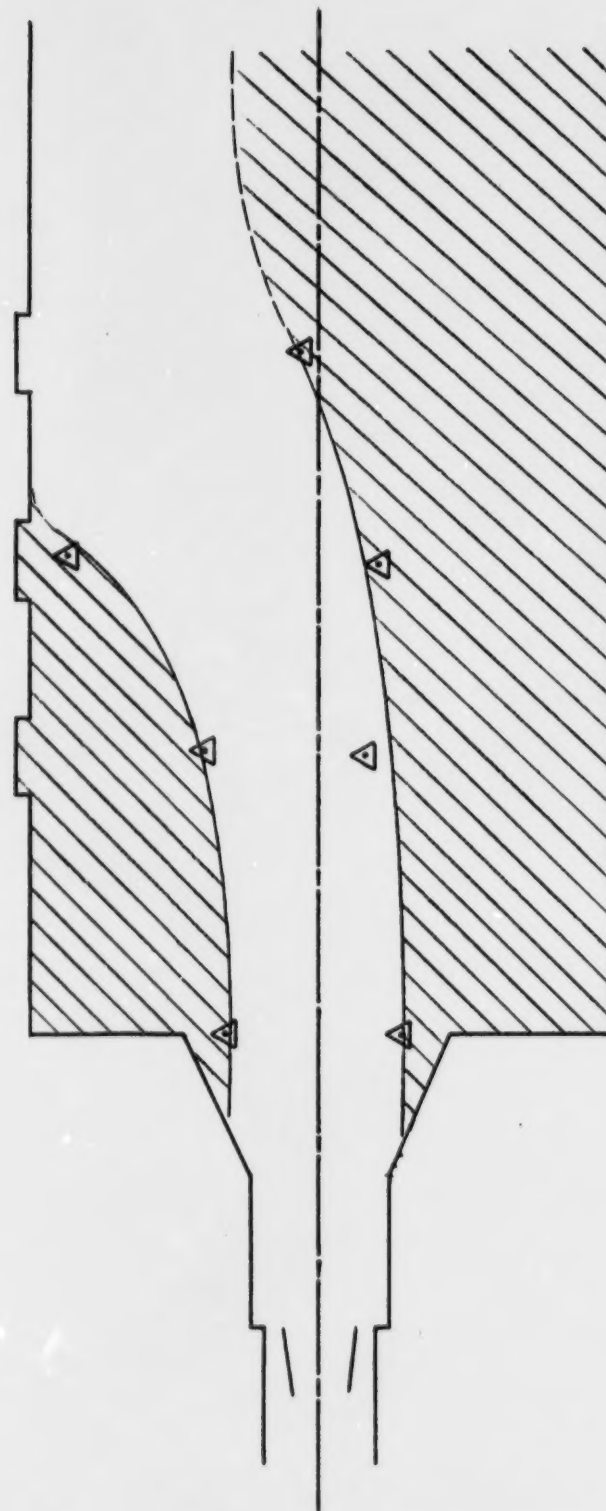


Fig. 3.33. Location of backflow region boundaries, swirler setting 05.

Fig. 3.34:

EXPERIMENT NO. 1T05H1

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- * RADIAL VELOCITY/VREF

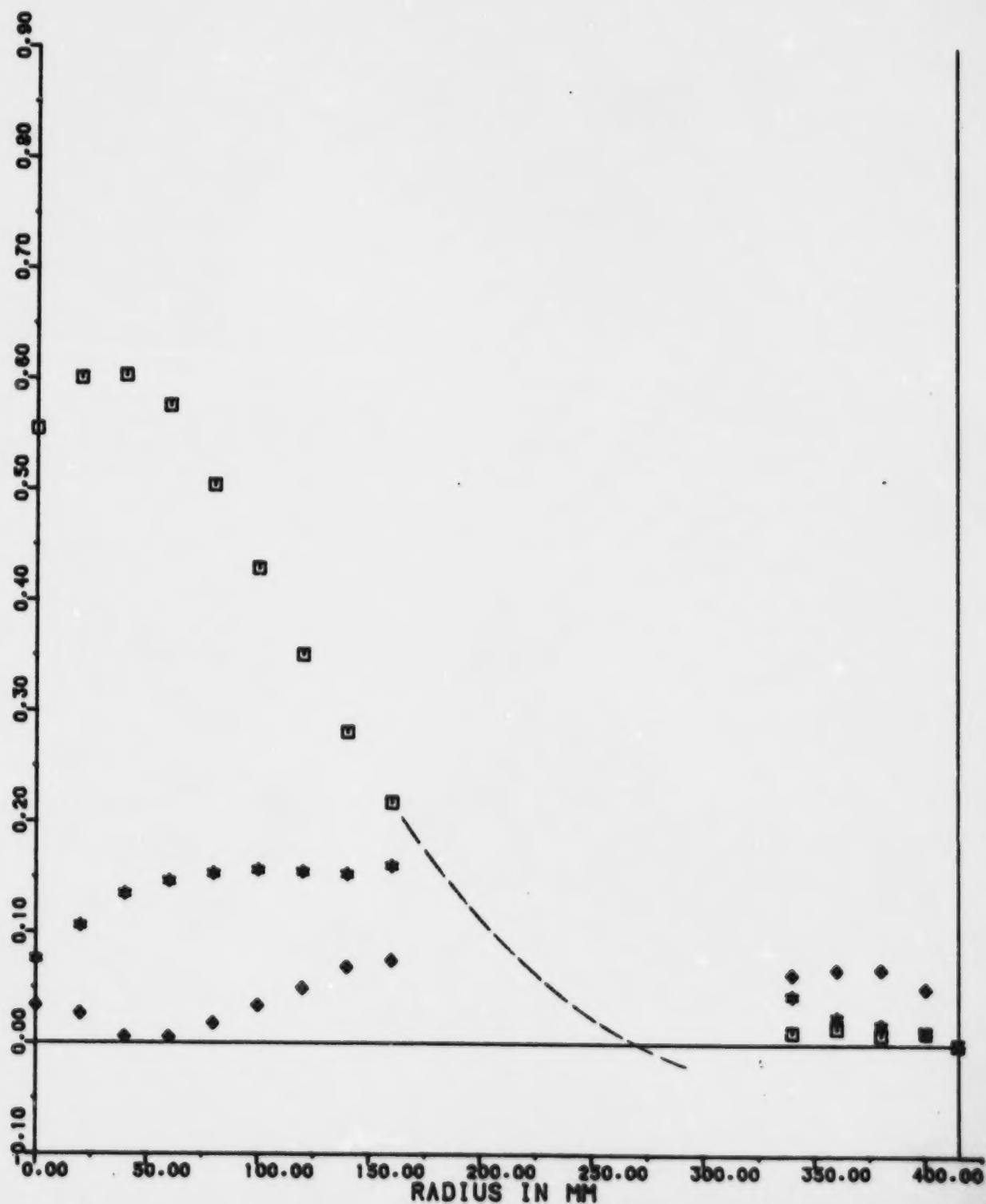


Fig. 3.35:

EXPERIMENT NO. 2T05H1

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- ★ RADIAL VELOCITY/VREF

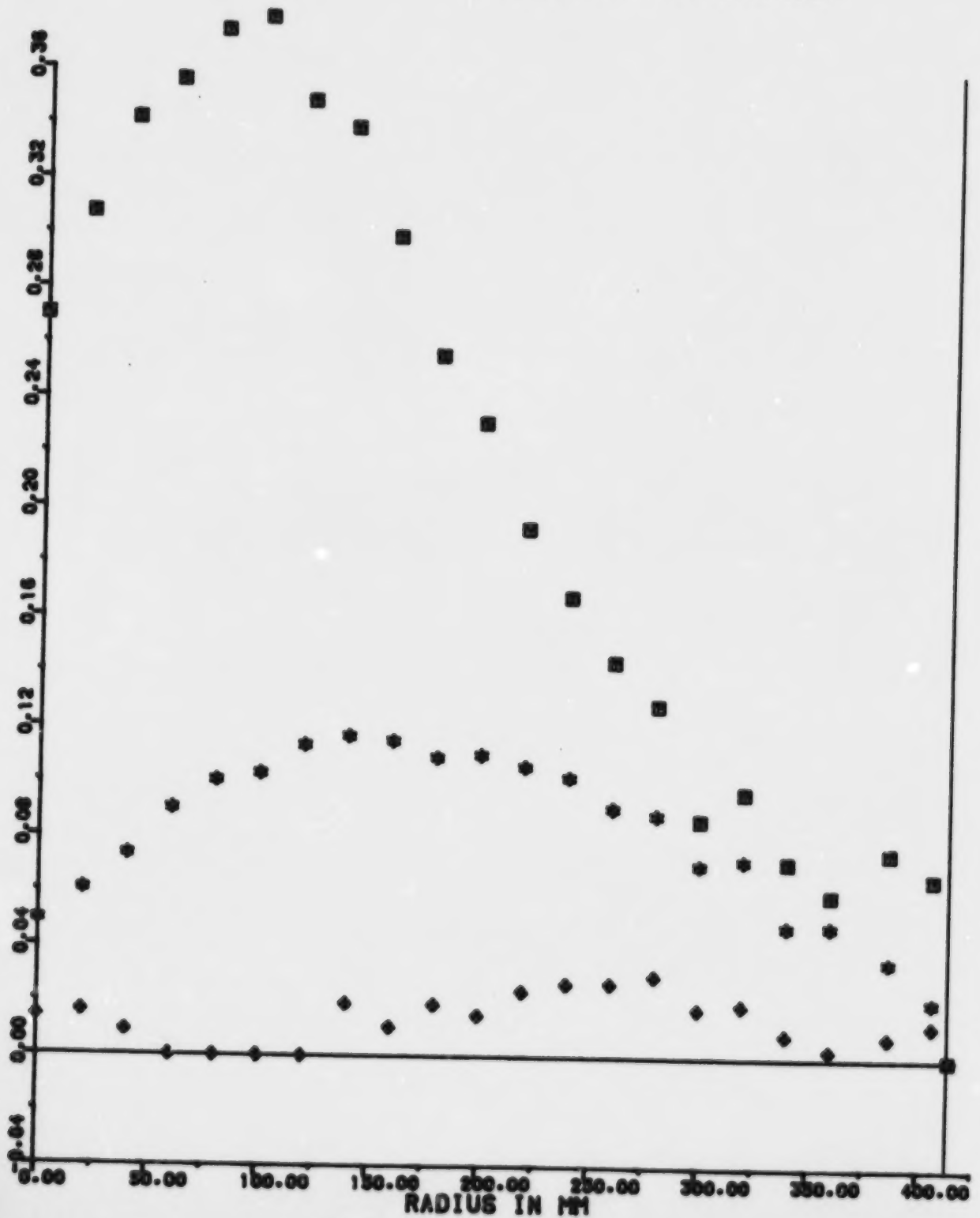


Fig. 3.36:

EXPERIMENT NO. 3T05H1

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- ★ RADIAL VELOCITY/VREF

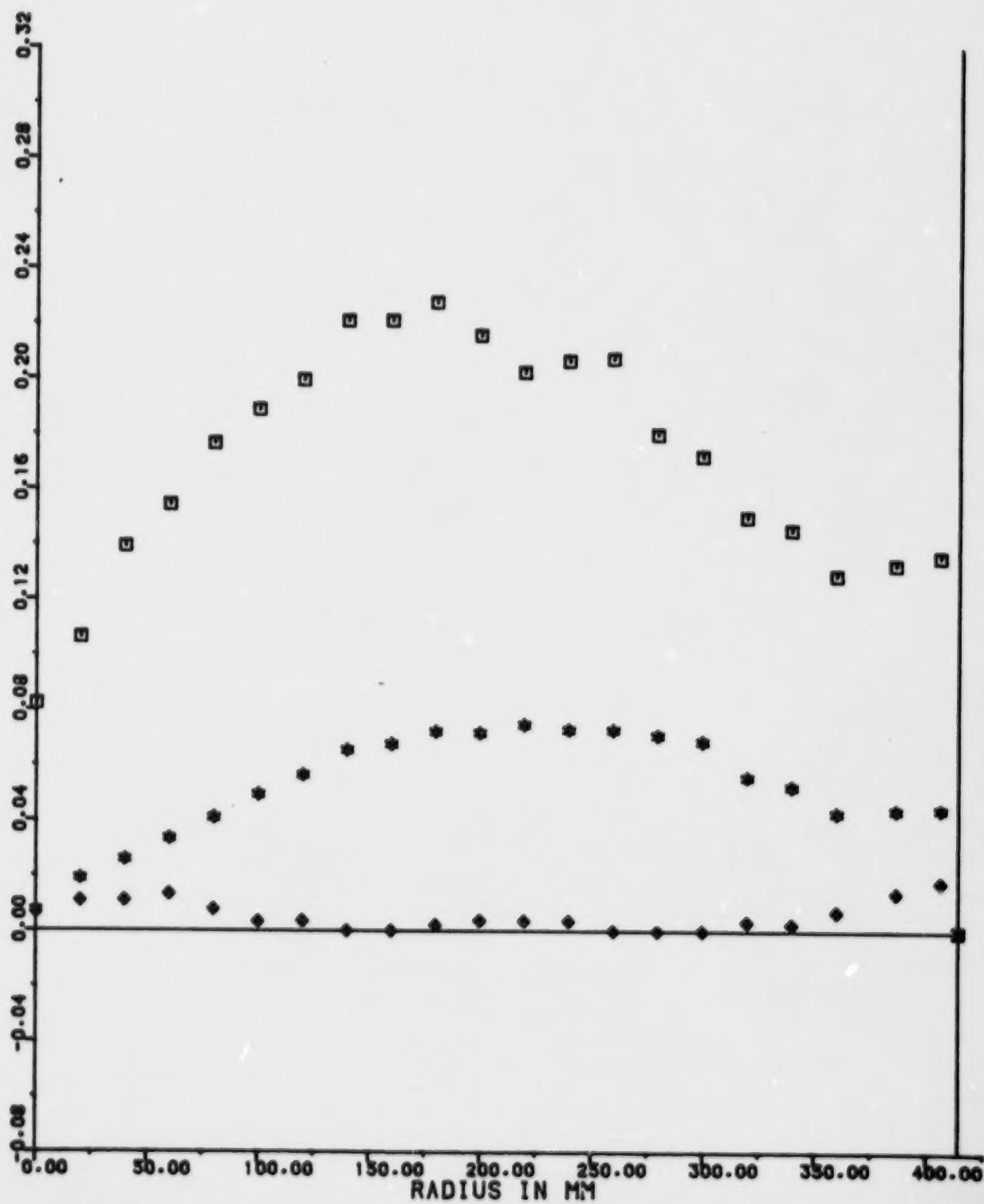
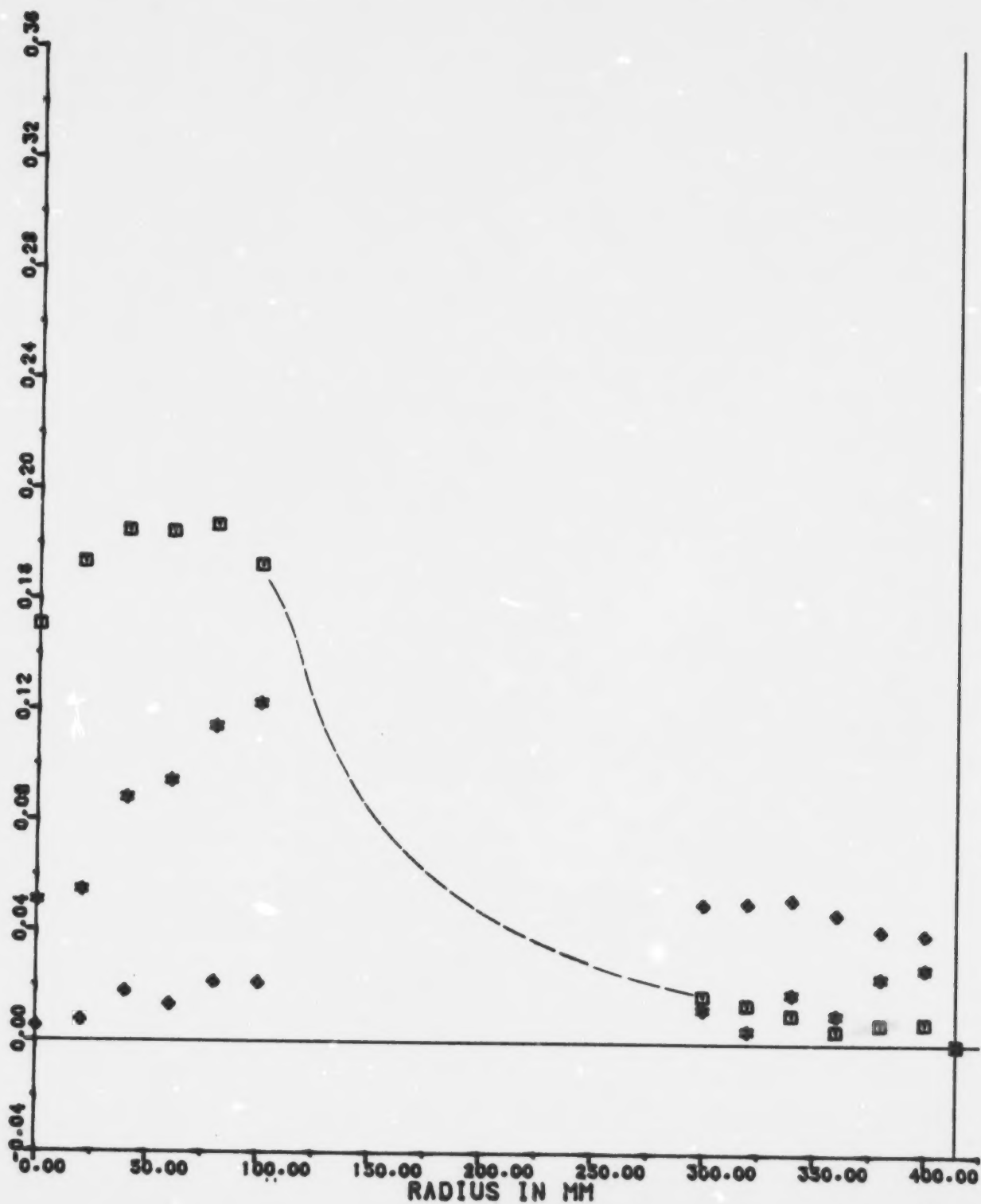


Fig. 3.37:

EXPERIMENT NO. 1T10H1

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- * RADIAL VELOCITY/VREF



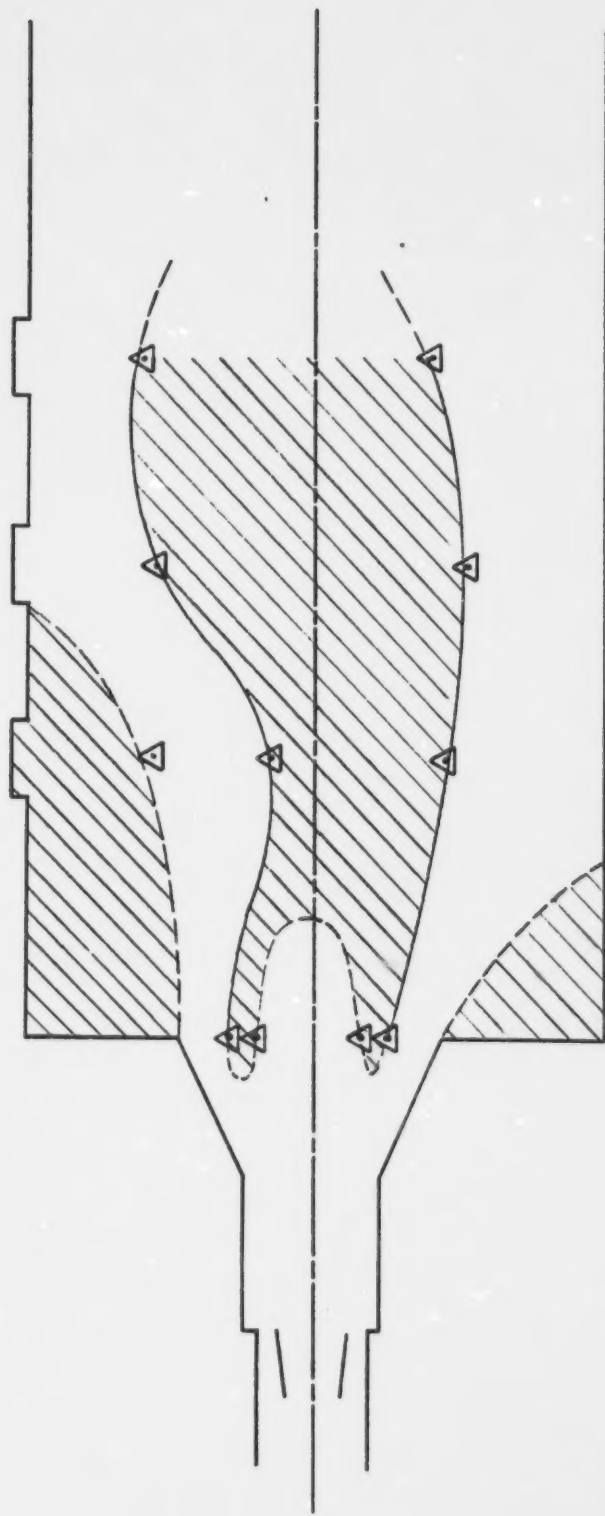


Fig. 3.38. Location of backflow region boundaries, swirler setting 20.

Fig. 3.39:

EXPERIMENT NO. 1T20H1

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- ★ RADIAL VELOCITY/VREF

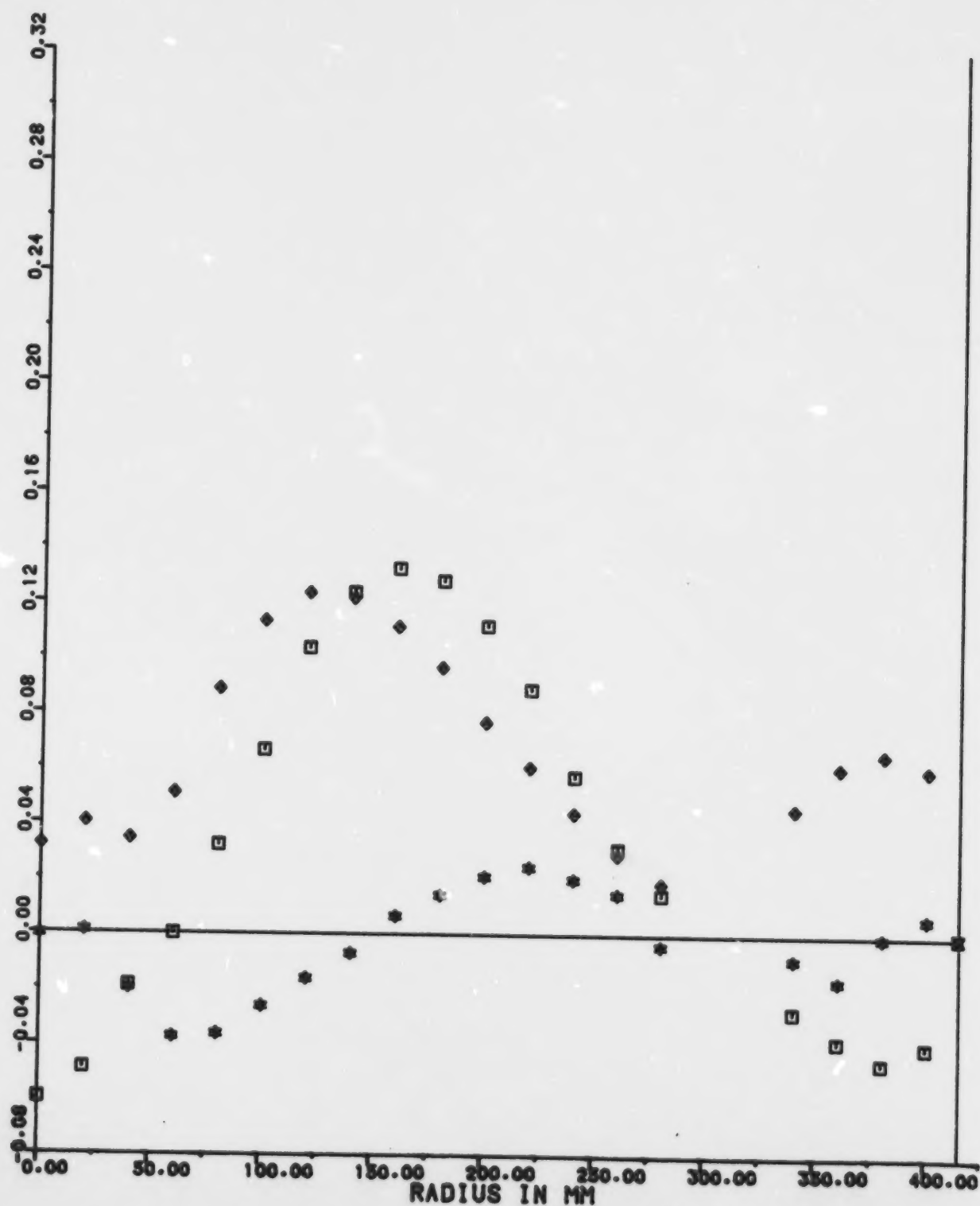


Fig. 3.40:

EXPERIMENT NO. 2T20H1

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- ★ RADIAL VELOCITY/VREF

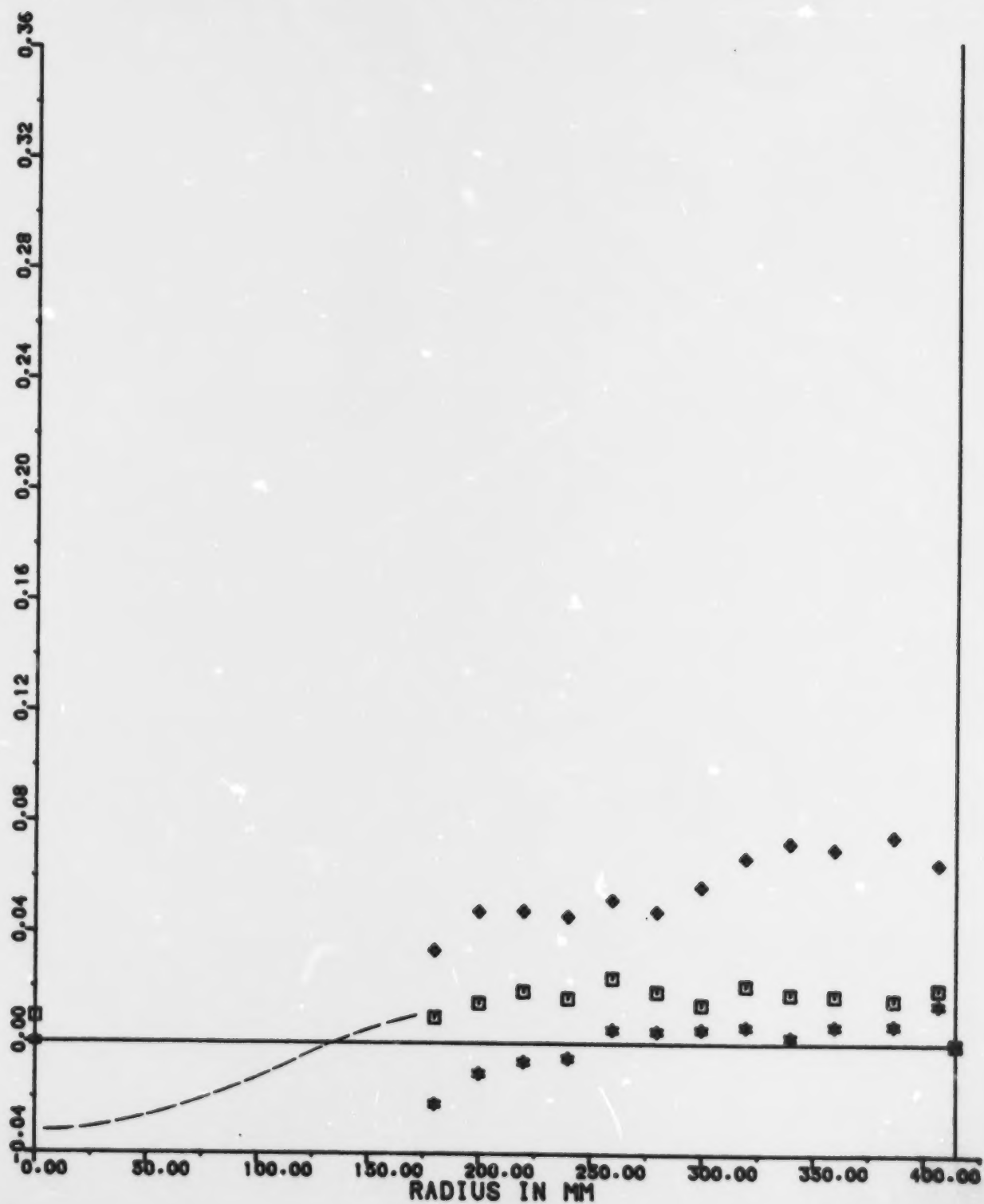
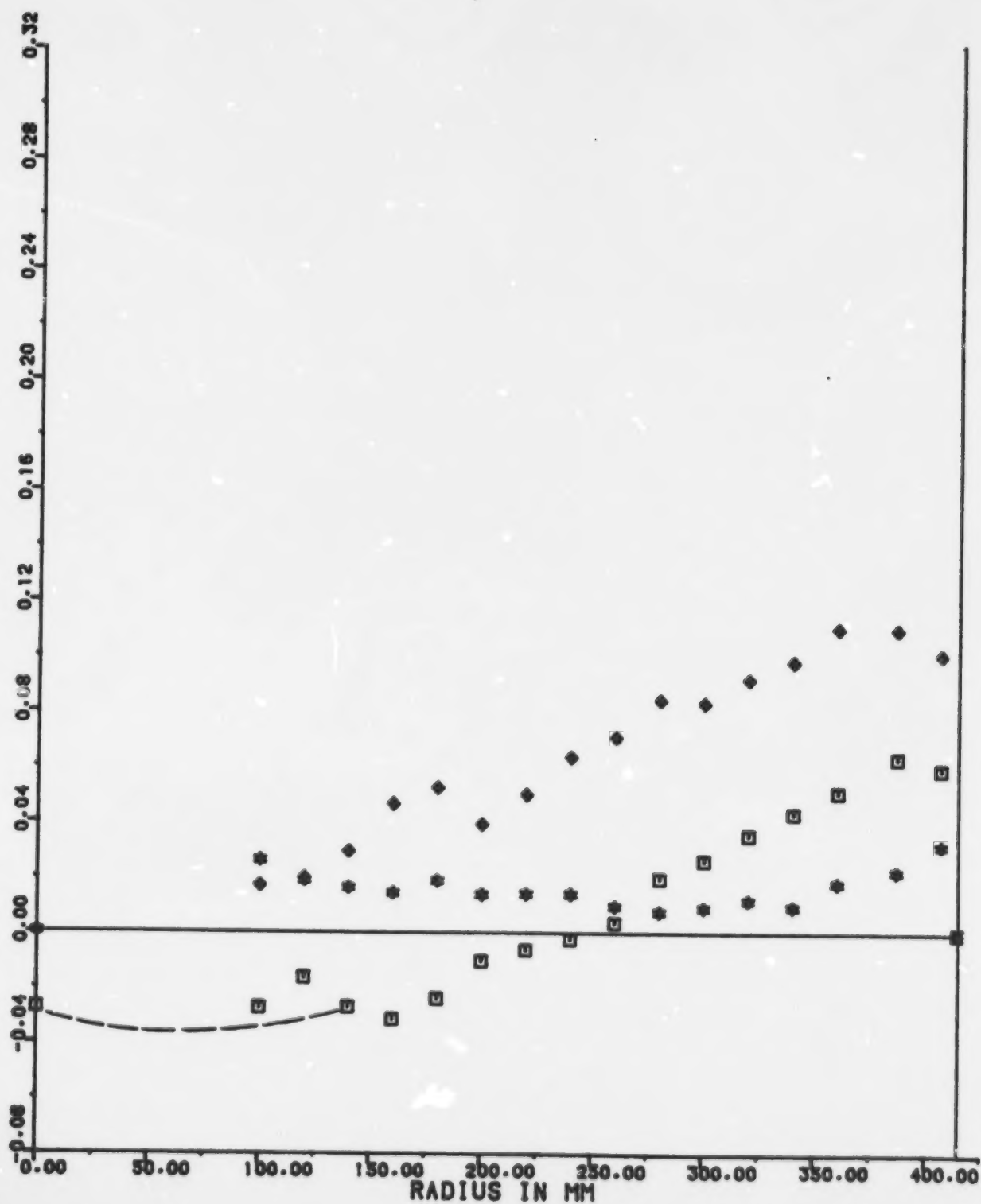


Fig. 3.41:

EXPERIMENT NO. 3T20H1

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- ★ RADIAL VELOCITY/VREF



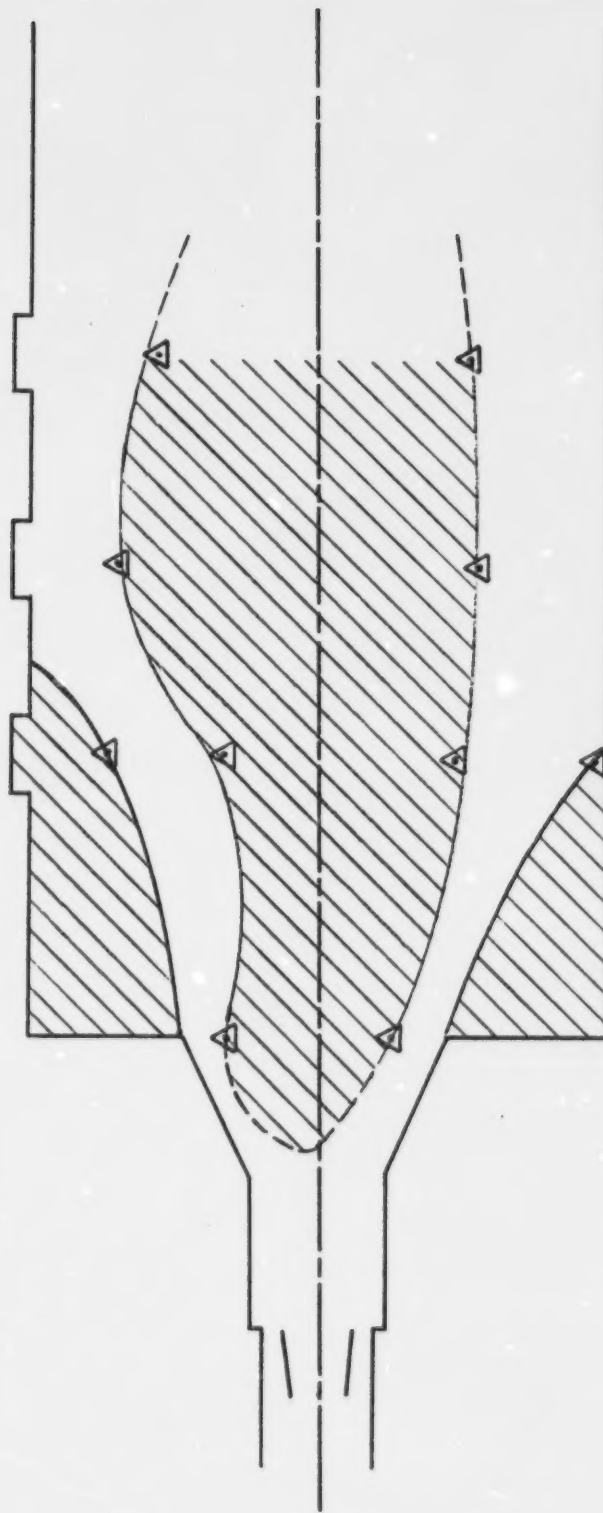


Fig. 3.42: Location of backflow region boundaries, swirl setting 30.

Fig. 3.43:

EXPERIMENT NO. 1T30H1

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- * RADIAL VELOCITY/VREF

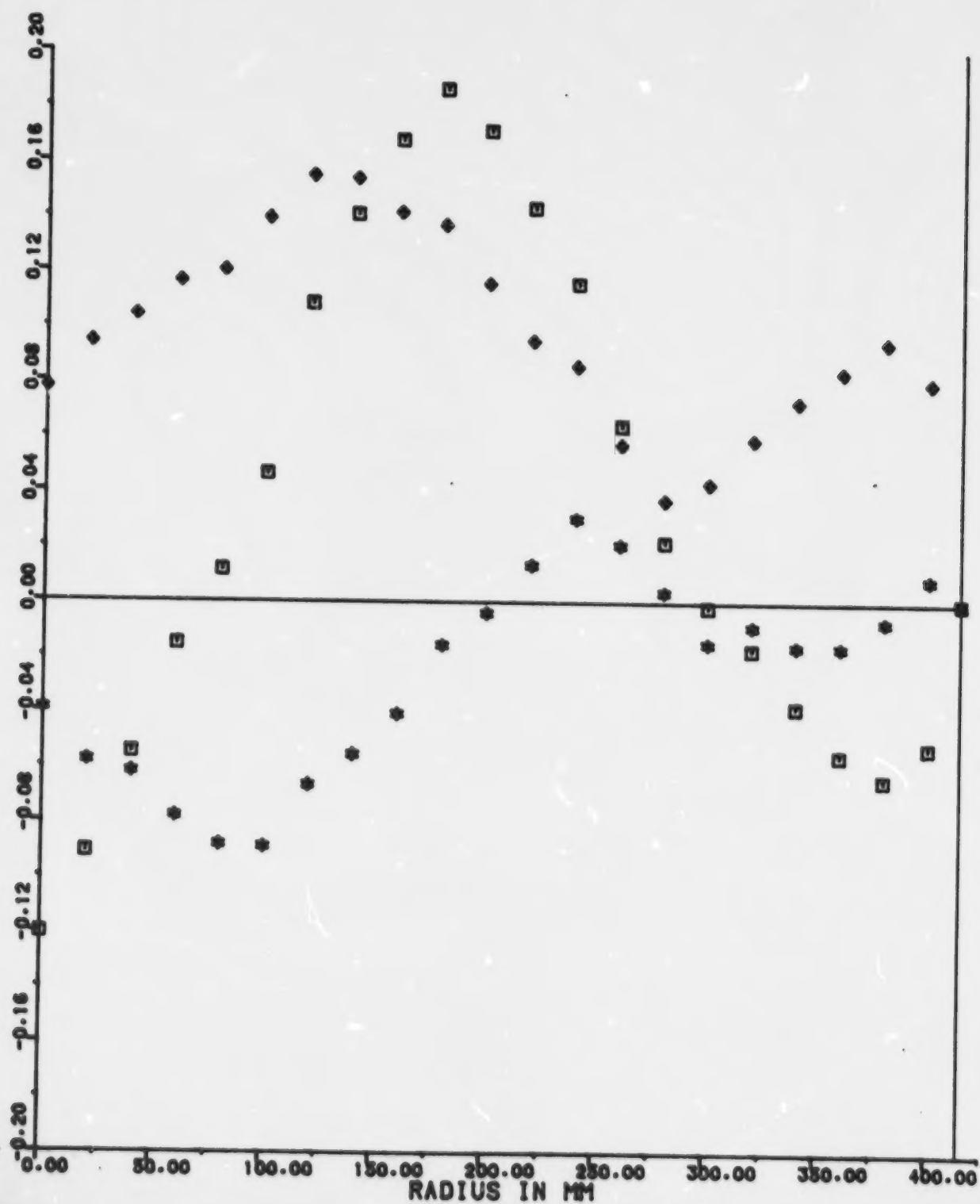


Fig. 3.44:

EXPERIMENT NO. 2T30H2

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- ★ RADIAL VELOCITY/VREF

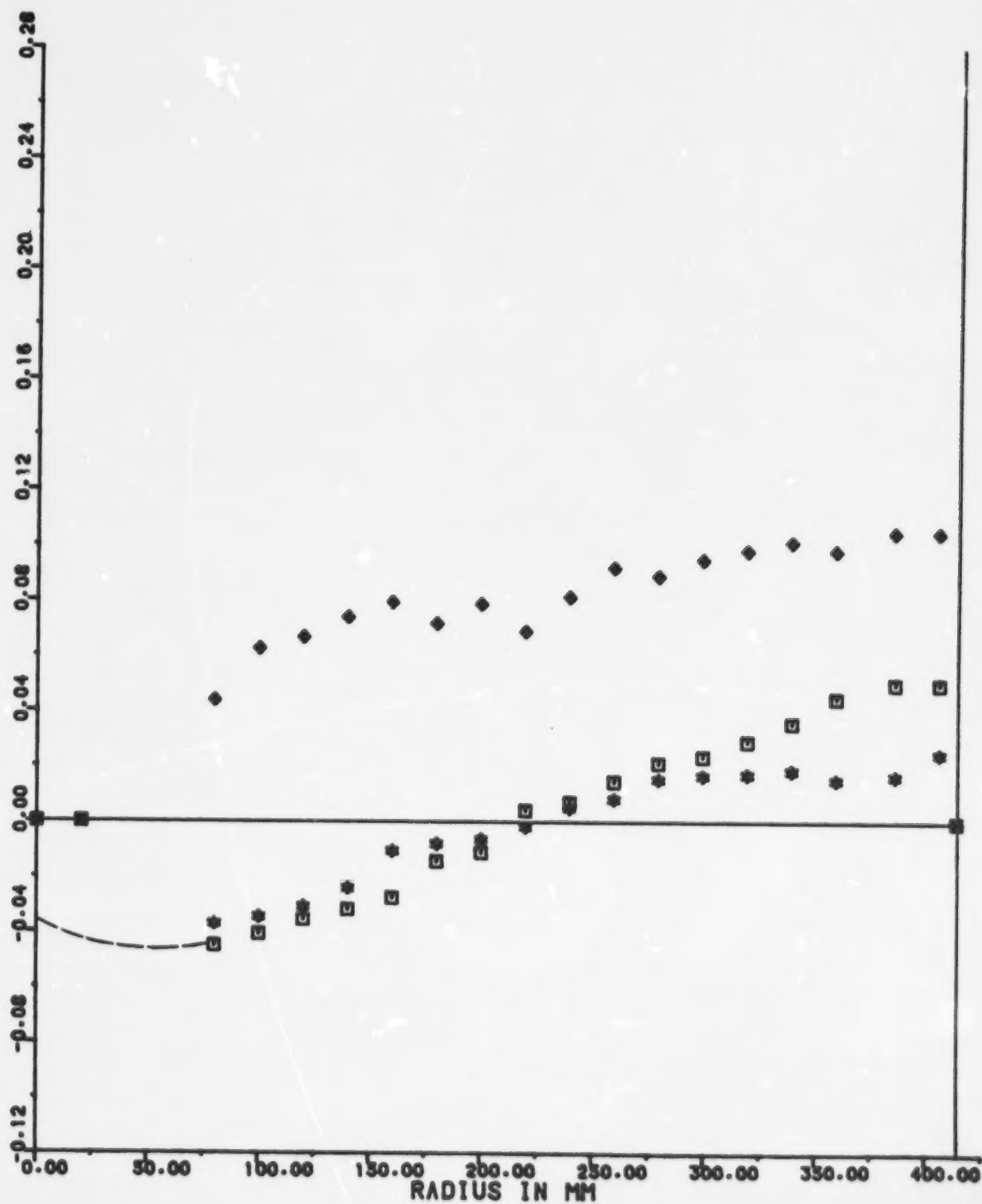
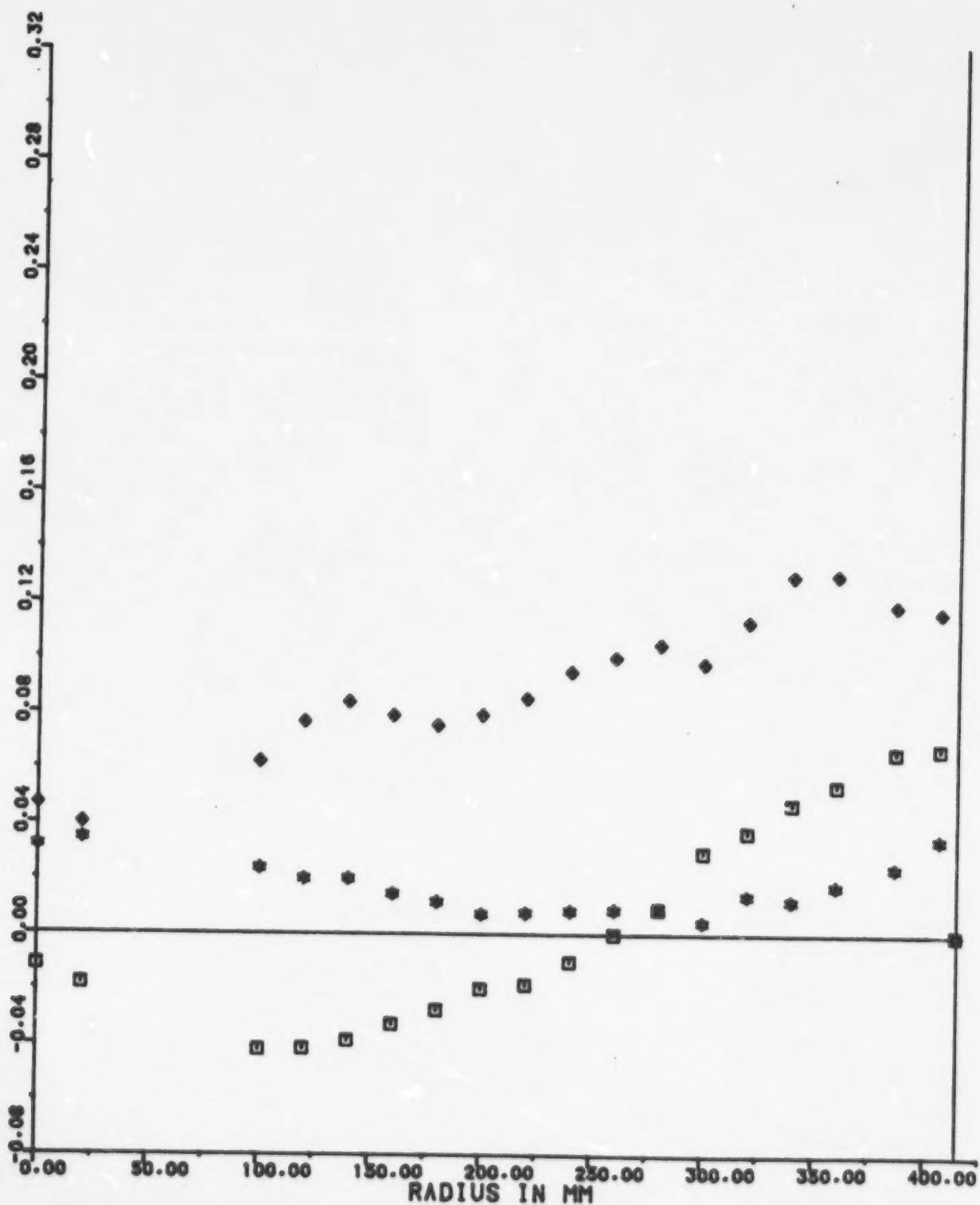


Fig. 3.45:

EXPERIMENT NO. 3T30H1

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- ★ RADIAL VELOCITY/VREF



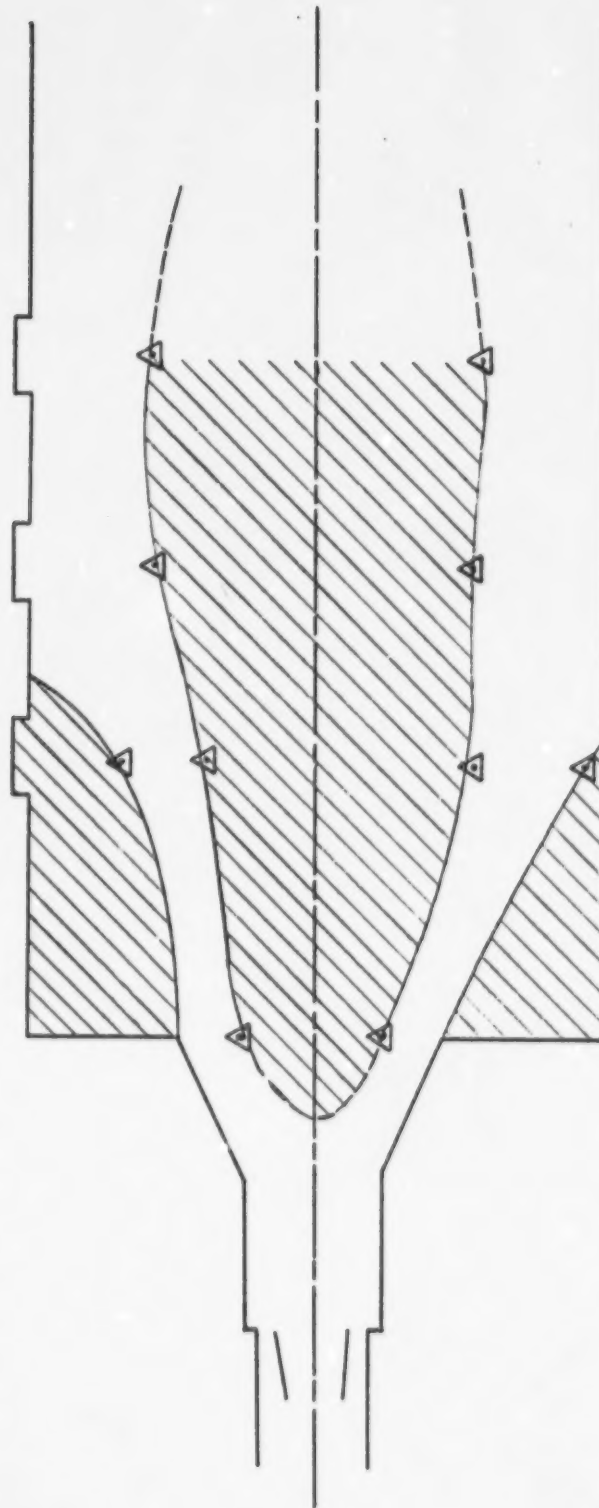


Fig. 3.46: Location of backflow region boundaries, swirler setting 40.

Fig. 3.47:

EXPERIMENT NO. 1T40H1

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- * RADIAL VELOCITY/VREF

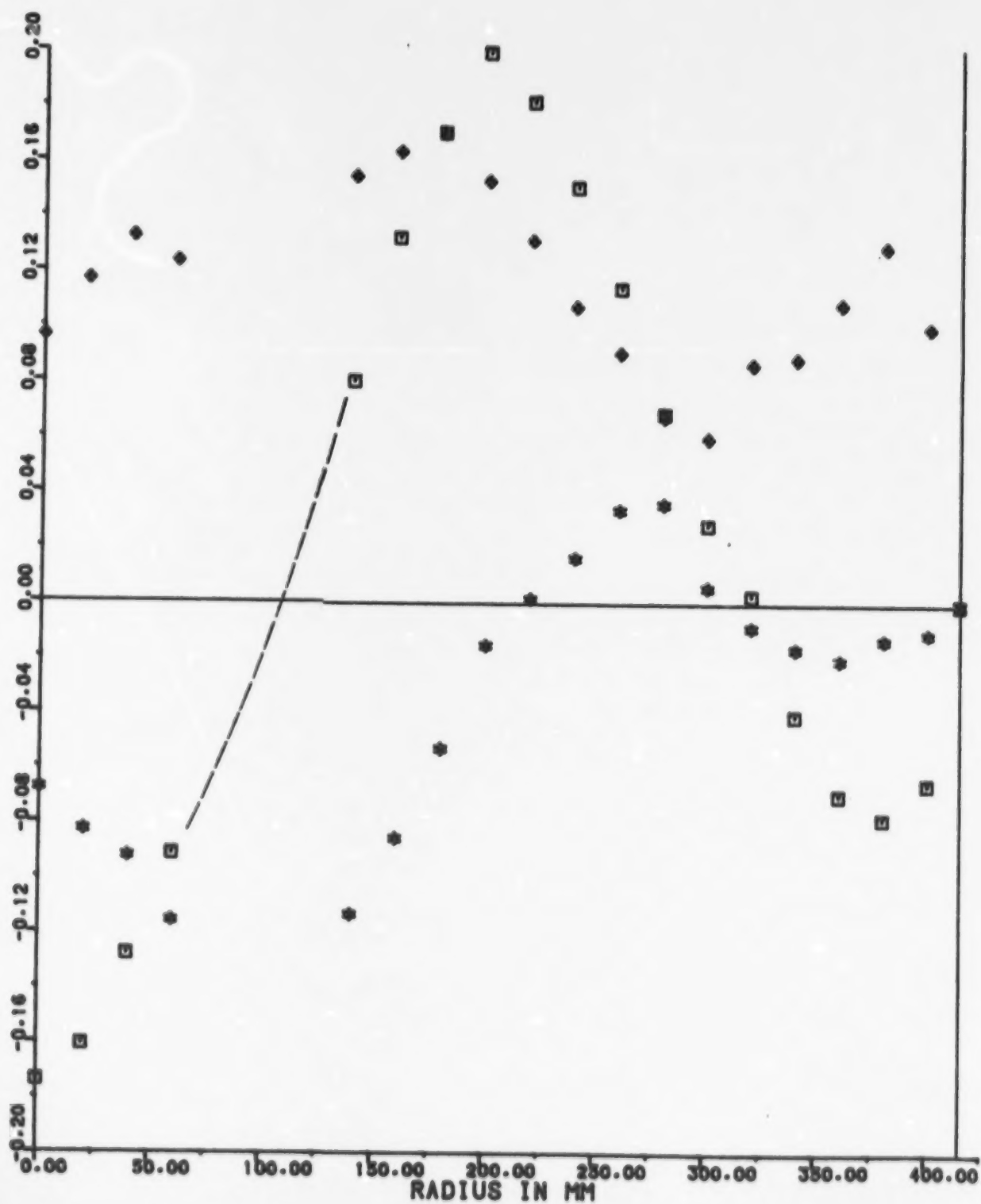


Fig. 3.48:

EXPERIMENT NO. 2T40H2

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- * RADIAL VELOCITY/VREF

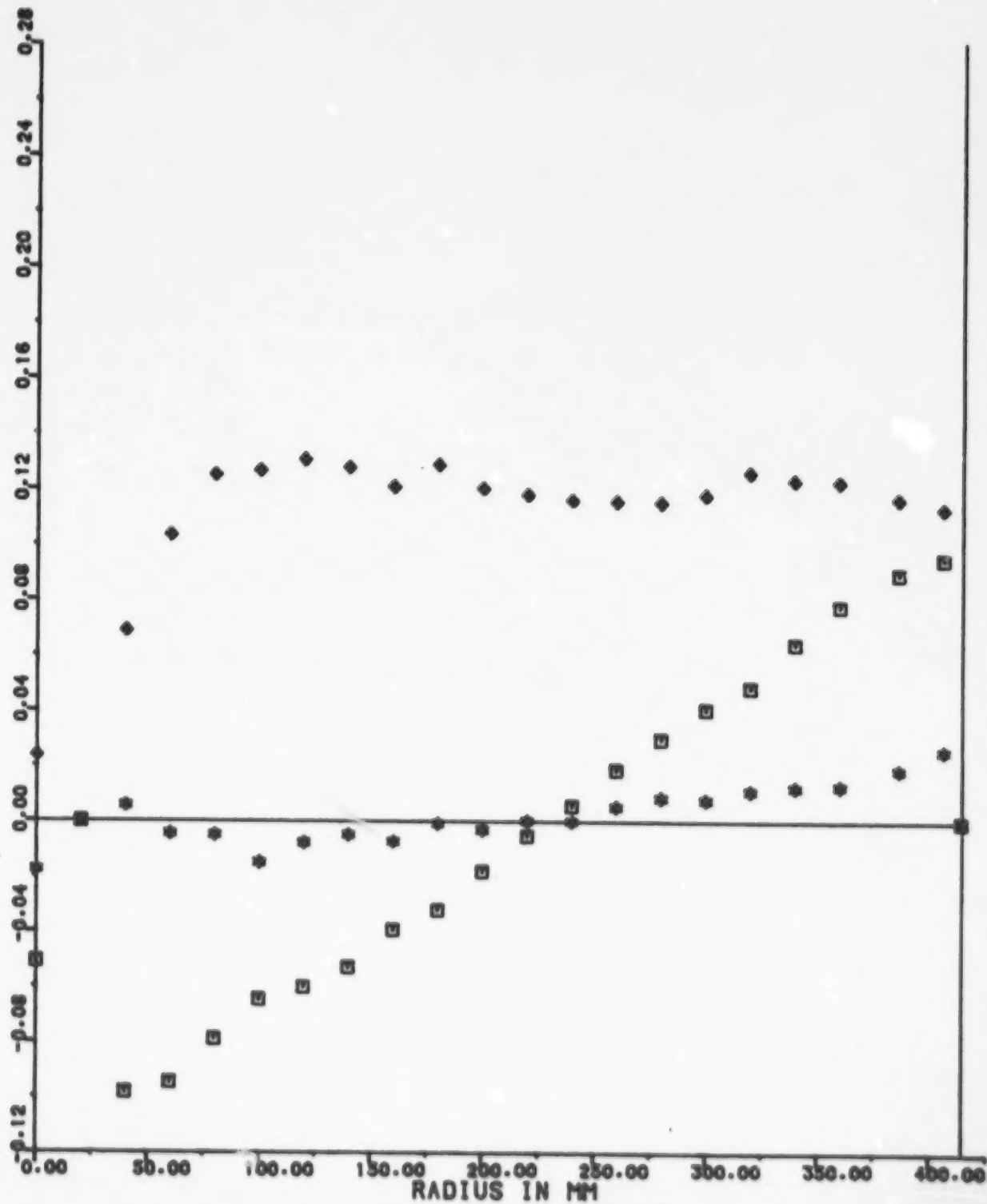
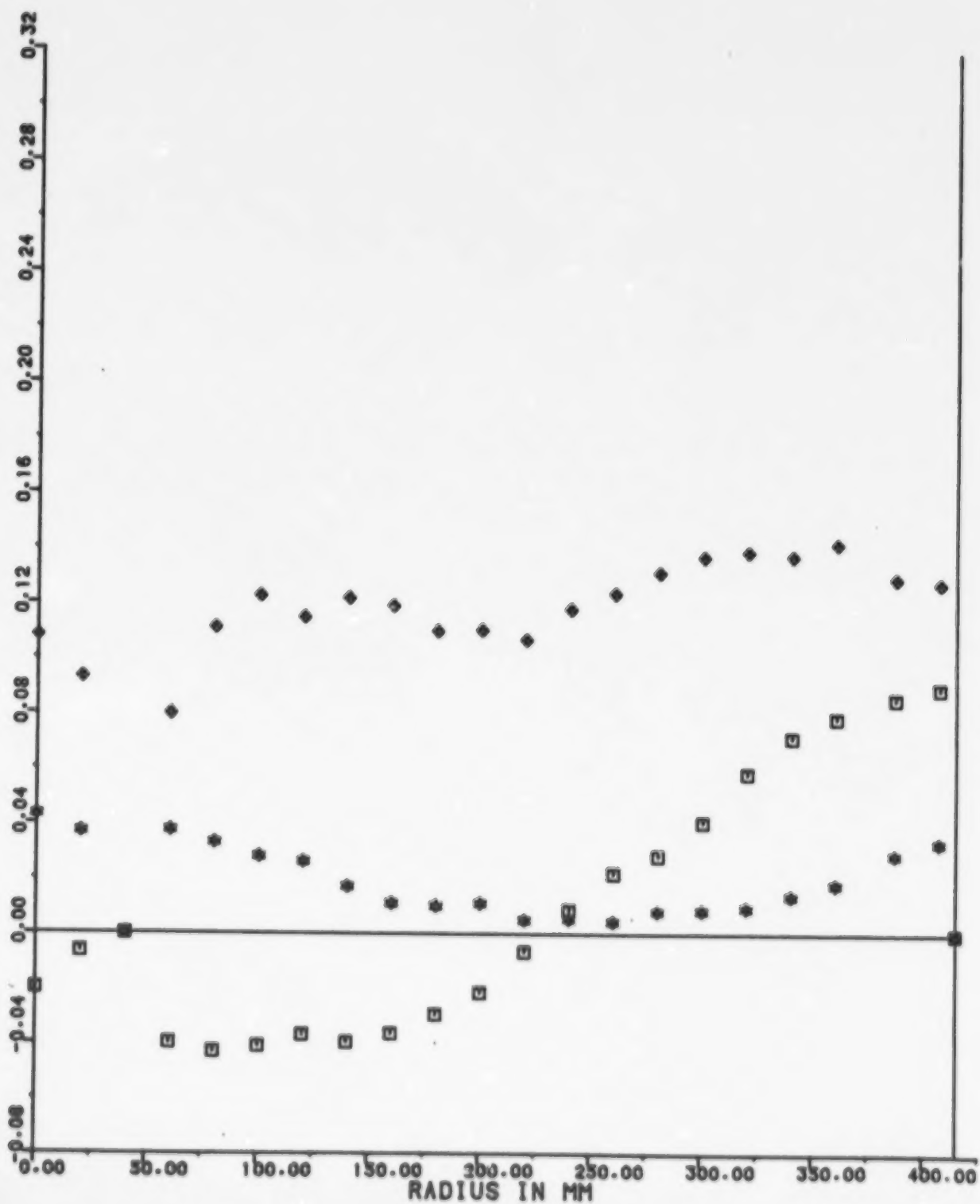


Fig. 3.49:

EXPERIMENT NO. 3T40H1

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- ★ RADIAL VELOCITY/VREF



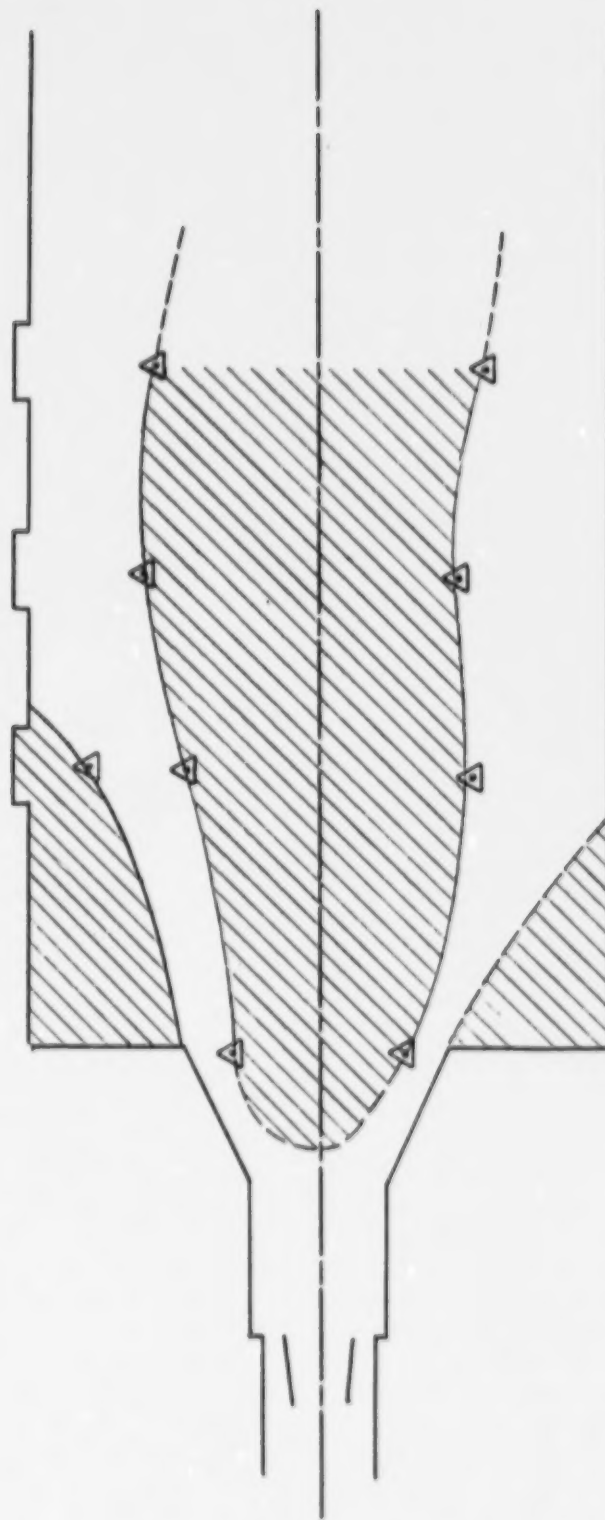


Fig. 3.50: Location of backflow region boundaries, swirl setting 45.

Fig. 3.51:

EXPERIMENT NO. 1T45H1

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- ★ RADIAL VELOCITY/VREF

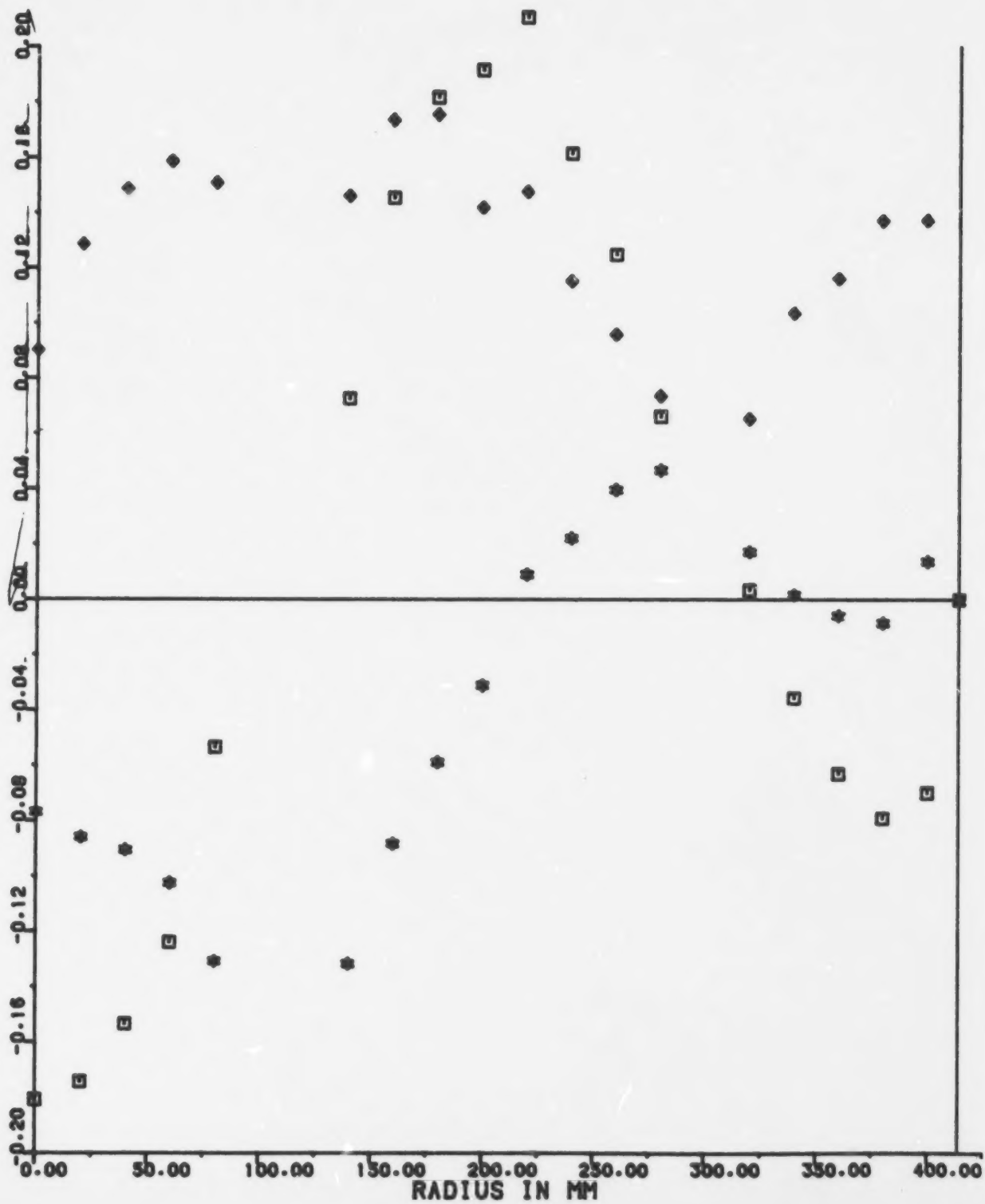


Fig. 3.52:

EXPERIMENT NO. 2T45H2

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- ★ RADIAL VELOCITY/VREF

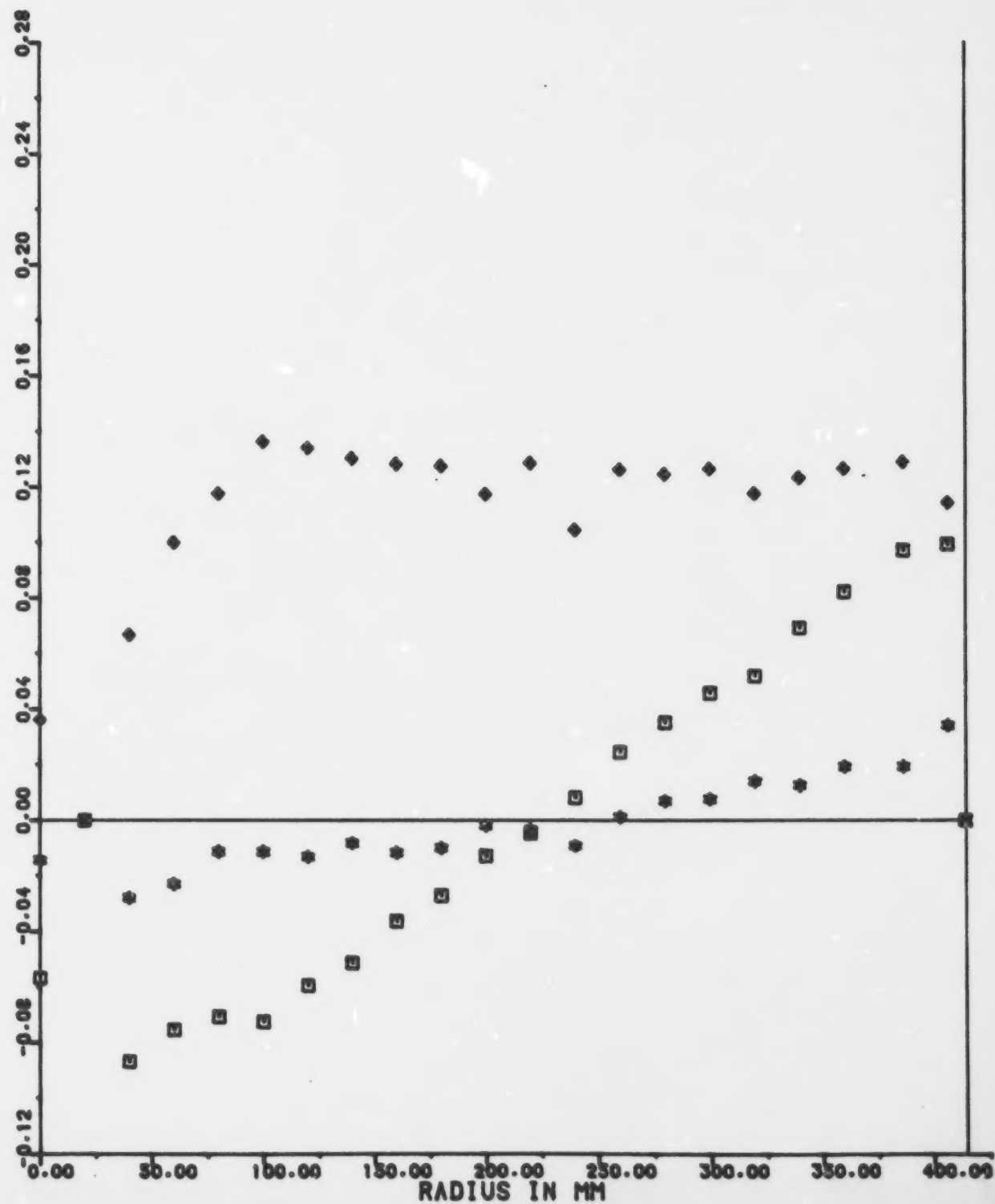


Fig. 3.53:

EXPERIMENT NO. 3T45H1

- AXIAL VELOCITY/VREF
- ◇ TANGENTIAL VELOCITY/VREF
- ★ RADIAL VELOCITY/VREF

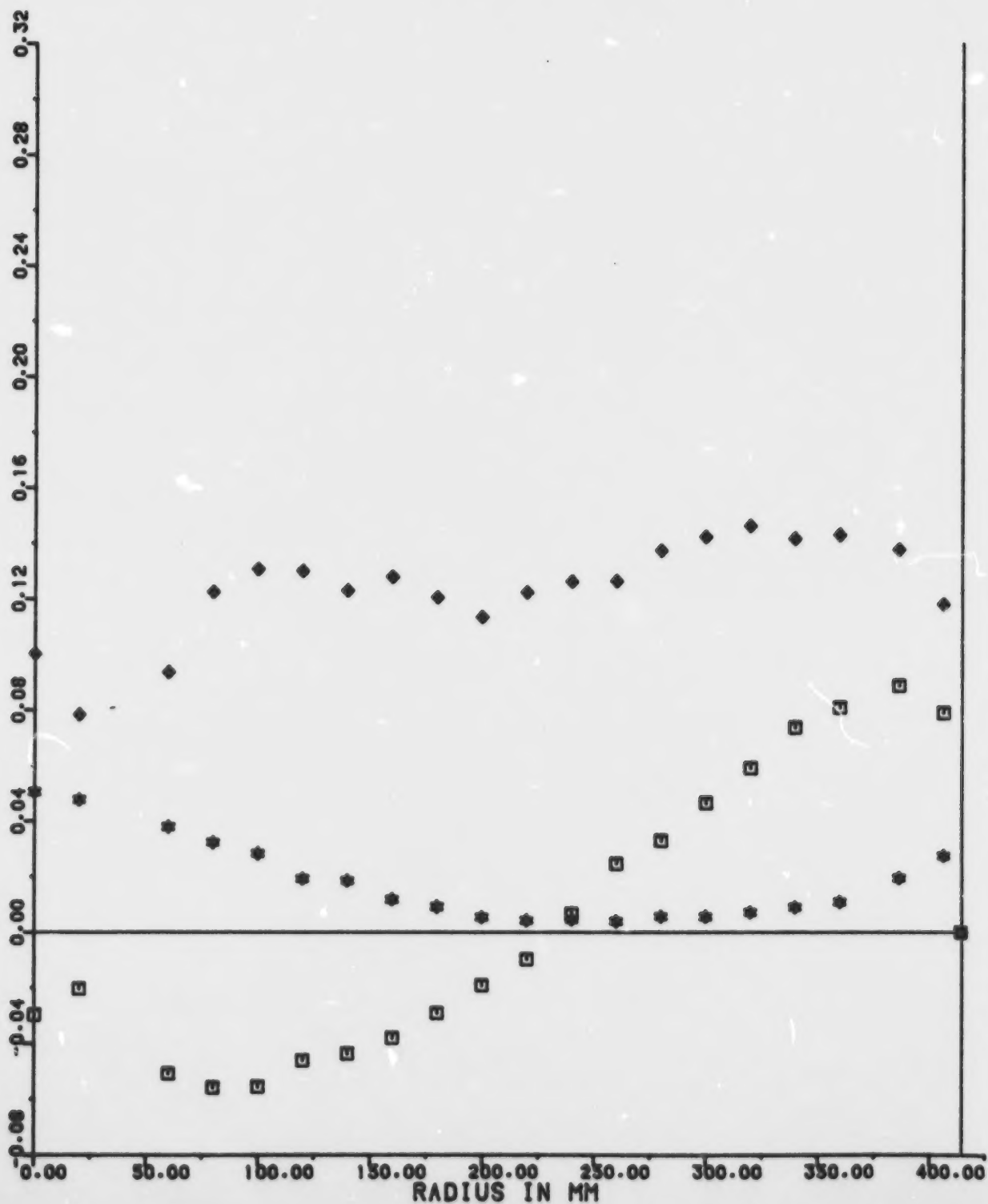
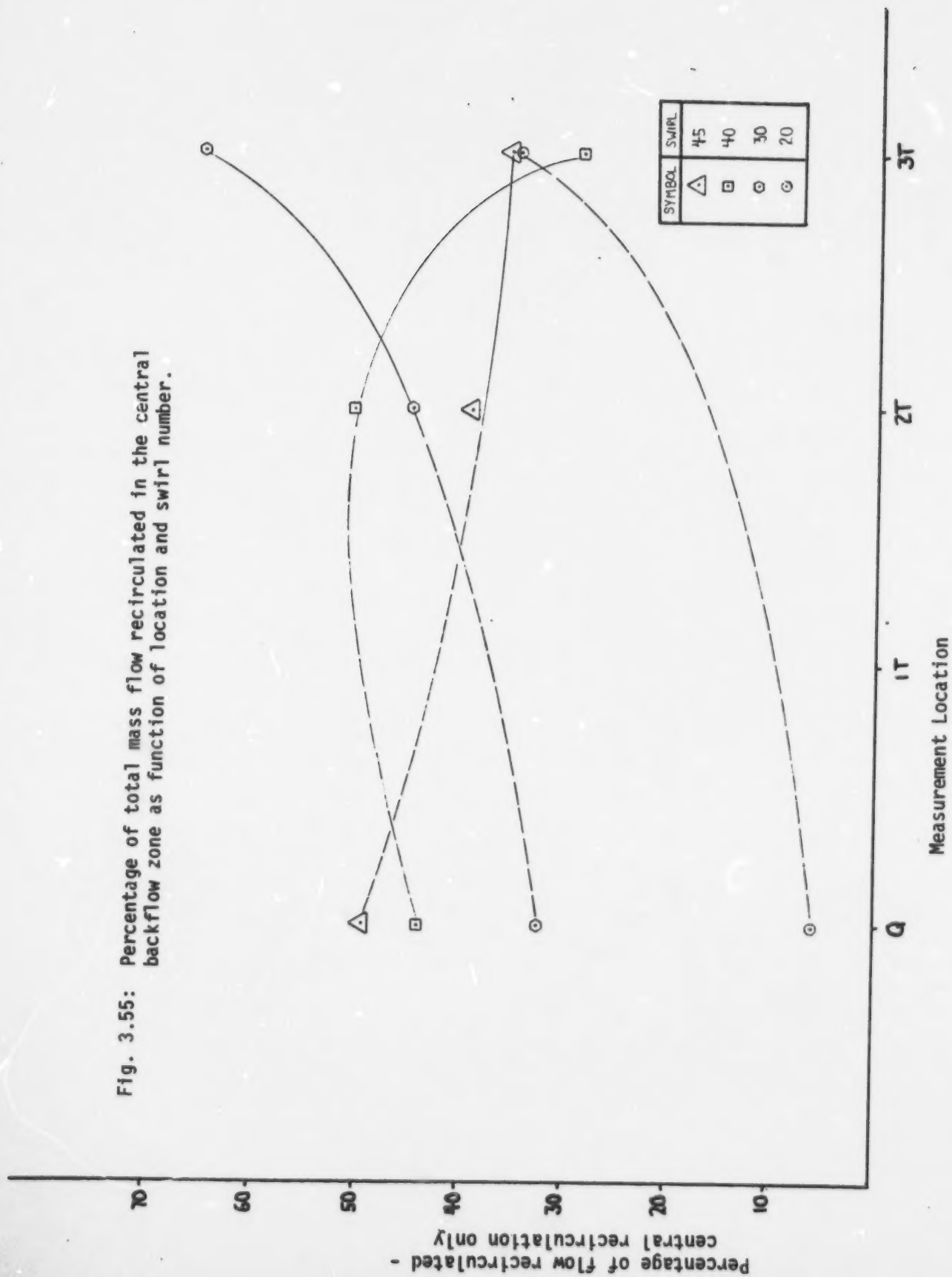




Fig. 3.54: Streamlines at a swirl setting of 45. The outer recirculation zone has not been included.

Fig. 3.55: Percentage of total mass flow recirculated in the central backflow zone as function of location and swirl number.



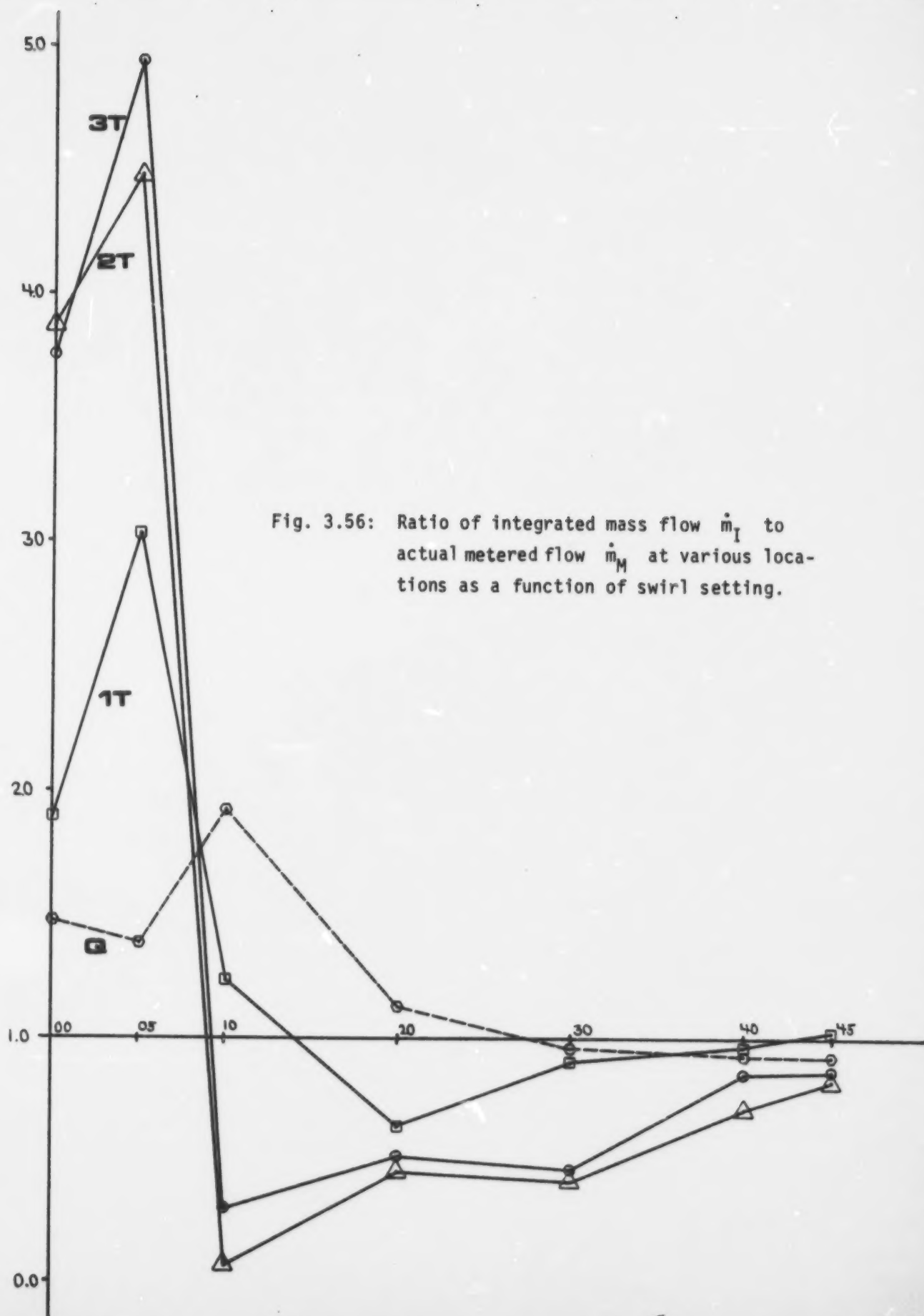


Fig. 3.56: Ratio of integrated mass flow $\dot{m}_I$ to actual metered flow $\dot{m}_M$ at various locations as a function of swirl setting.

APPENDIX I

Computer Printouts of Velocity Data

Notes:

$$\text{"M-TOTAL"} = \dot{m}_M$$

$$\text{"AT TEST SECTION M-TOTAL"} = \dot{m}_I$$

$$\text{"SWIRL NUMBER"} = S$$

$$\text{"SWIRL NUMBER W.R.T. THRUST"} = S'$$

$$\text{"STREAM"} = \psi(r)$$

$$\text{"GX-FUNC"} = \psi_x(r)$$

$$\text{"GT-FUNC"} = \psi_\phi(r)$$

ERRATUM:

The second last entry in each computer printout should read:

VREF = _____ M/S BASED ON THROAT RADIUS OF 0.0762 M.

SWIRL GENERATOR EXIT

BARRINGS & PITCH ANGLE OF 40.0 DEG. WAS CALCULATED AT 1 & 2 40.0 DEG. THIS POINT HAS BEEN ELIMINATED.

EXPERIMENT NO. 580H1

PROBE SITE 5

PRIMARY TEMPERATURE = 33.0 C

SECONDARY TEMPERATURE = 38.0 C

BAROMETRIC PRESSURE = 759.3 TORR

Q (IN)	U (M/S)	V (M/S)	W (M/S)	PST-PU (PA)	U/VREF	U/VREF	V/VREF	W/VREF	(PST-PU)/PREP		STREAM	GR-FUNC	GT-FU
									EXPT	THEORY			
0.0	49.01	0.00	2.34	-191.78	1.273	0.000	0.041	1.279	-0.231	0.188	0.000	0.000	0.000
3.0	50.33	0.00	2.48	-184.11	1.308	0.000	0.078	1.309	-0.212	0.188	0.002	0.001	0.000
6.0	51.45	0.00	3.17	-183.48	1.341	0.000	0.092	1.343	-0.187	0.188	0.004	0.001	0.000
9.0	52.45	0.00	3.48	-189.77	1.373	0.000	0.098	1.376	-0.205	0.188	0.014	0.001	0.000
12.0	54.97	0.00	4.19	-202.94	1.405	0.000	0.109	1.409	-0.244	0.188	0.032	0.040	0.000
15.0	54.49	0.00	4.78	-214.48	1.419	0.000	0.124	1.420	-0.259	0.188	0.052	0.094	0.000
18.0	53.21	0.00	5.31	-171.48	1.382	0.000	0.138	1.389	-0.207	0.188	0.079	0.092	0.000
21.0	51.47	0.00	5.89	-189.08	1.337	0.000	0.192	1.348	-0.204	0.188	0.102	0.124	0.000
24.0	47.91	0.38	6.21	-204.47	1.245	0.000	0.181	1.298	-0.247	0.188	0.131	0.157	0.000
27.0	42.43	0.00	6.38	-207.03	1.112	0.000	0.188	1.124	-0.258	0.188	0.141	0.189	0.000
30.0	37.03	0.00	6.31	-228.79	0.982	0.000	0.184	0.978	-0.278	0.188	0.181	0.218	0.000
33.0	34.78	0.00	5.84	-232.11	0.798	0.000	0.198	0.814	-0.280	0.188	0.219	0.237	0.000
36.0	26.92	0.00	5.31	-211.98	0.637	0.000	0.138	0.692	-0.349	0.188	0.243	0.283	0.000
39.0	18.05	0.00	4.93	-213.43	0.480	0.000	0.118	0.584	-0.297	0.188	0.284	0.284	0.000
42.0	13.92	0.00	3.81	-199.00	0.391	0.000	0.099	0.389	-0.240	0.188	0.281	0.279	0.000
45.0	8.31	0.00	1.98	-189.00	0.218	0.000	0.087	0.218	-0.223	0.188	0.284	0.274	0.000
48.0	47.13	0.00	-1.38	-77.44	1.229	0.000	-0.039	1.219	-0.093	0.188	0.389	0.348	0.000
51.0	47.89	0.00	-0.18	-83.87	1.222	0.000	-0.009	1.222	-0.077	0.188	0.438	0.419	0.000
54.0	44.44	0.00	0.79	-81.87	1.213	0.000	0.020	1.213	-0.074	0.188	0.507	0.495	0.000
57.0	44.29	0.00	1.29	-49.10	1.202	0.000	0.033	1.202	-0.094	0.188	0.588	0.573	0.000
60.0	49.81	0.00	1.79	-39.14	1.190	0.000	0.048	1.191	-0.047	0.188	0.657	0.639	0.000
63.0	49.98	0.00	2.33	-34.33	1.184	0.000	0.091	1.188	-0.041	0.188	0.737	0.739	0.000
66.0	49.28	0.00	2.84	-21.70	1.178	0.000	0.074	1.174	-0.028	0.188	0.811	0.819	0.000
69.0	44.38	0.00	3.44	-6.02	1.191	0.000	0.090	1.194	-0.006	0.188	0.907	0.914	0.000
72.0	38.03	0.00	3.93	190.43	0.957	0.000	0.102	0.982	0.104	0.188	0.937	0.939	0.000
75.0	9.00	0.00	0.00	-9.30	0.000	0.000	0.000	0.000	0.000	0.000	1.000	1.000	0.000

500H1

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.2061
 SECONDARY MASS FLOW = 0.5544
 M-TOTAL = 0.761
 AT TEST SECTION M-TOTAL = 0.728
 M-TOT(1/2 TEST SEC)/M-TOT(1/2 INLET) = 1.034

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS	0.0000	0.000
M-BACK AT WALL	0.2000	0.000
TOTAL M-BACK	0.0000	0.000

MOMENTUM FLUXES

	KG/S	DIMENSIONLESS
ANGULAR MOMENTUM FLUX	0.000 N-M	0.000
AXIAL MOMENTUM FLUX	34.28 N	1.332
PRESSURE FORCE	1.734 N	0.057
THRUST	35.997 N	1.389
SWIRL NUMBER		0.000
SWIRL NUMBER (d.R.T. THRUST)		0.000

ENERGY FLUXES

	J/S	DIMENSIONLESS
AXIAL KINETIC ENERGY FLUX	779.94	1.332
TAN KINETIC ENERGY FLUX	0.00	0.000
TOTAL KINETIC ENERGY FLUX	780.71	1.340
PRESSURE ENERGY FLUX	-56.29	-0.100
TOTAL FLOW ENERGY FLUX	722.42	1.240

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
 VREF = 30.49 M/S BASED ON THROAT DIAMETER OF 0.0762 M
 REYNOLDS NO. = 6.398E 06

WARNING: A PITCH ANGLE OF 37.4 DEG. WAS CALCULATED AT R = 41.0 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF 39.1 DEG. WAS CALCULATED AT R = 49.0 MM. THIS POINT HAS BEEN ELIMINATED.

EXPERIMENT NO. 500L2

PROBE SITE 5

PRIMARY TEMPERATURE = 55.0 C
SECONDARY TEMPERATURE = 29.0 C
BAROMETRIC PRESSURE = 758.5 TORR

R (MM)	U (M/S)	V (M/S)	W (M/S)	PT-P0 (PA)	U/VREF	V/VREF	W/VREF	WT/VREF	(PT-P0)/PREF EXPT	(PT-P0)/PREF THEORY	STREAB	SE-FUNC	ST-P
30.0	11.14	0.00	1.10	-13.78	1.219	0.000	0.138	1.229	-0.299	0.003	0.000	0.000	0.000
31.0	11.12	0.00	1.21	-13.81	1.212	0.000	0.143	1.221	-0.291	0.003	0.000	0.002	0.000
32.0	11.30	0.00	1.40	-11.30	1.241	0.000	0.160	1.291	-0.236	0.003	0.007	0.004	0.000
33.0	11.08	0.00	1.50	-10.33	1.270	0.000	0.168	1.289	-0.300	0.003	0.010	0.019	0.000
34.0	11.09	0.00	1.60	-10.01	1.303	0.000	0.183	1.318	-0.296	0.003	0.030	0.039	0.000
35.0	12.29	0.00	1.80	-12.00	1.338	0.000	0.200	1.391	-0.272	0.003	0.047	0.050	0.000
36.0	12.11	0.00	1.99	-9.30	1.321	0.000	0.217	1.330	-0.197	0.003	0.000	0.003	0.000
37.0	11.00	0.00	2.19	-12.00	1.300	0.000	0.230	1.327	-0.202	0.003	0.004	0.114	0.000
38.0	11.33	0.00	2.28	-11.02	1.230	0.000	0.240	1.200	-0.232	0.003	0.122	0.147	0.000
39.0	10.00	0.00	2.30	-19.01	1.191	0.000	0.250	1.179	-0.316	0.003	0.192	0.179	0.000
40.0	9.00	0.00	2.30	-10.40	0.970	0.000	0.200	1.000	-0.227	0.003	0.101	0.200	0.000
42.0	7.04	0.00	2.47	-9.30	0.821	0.000	0.270	0.880	-0.200	0.003	0.300	0.232	0.000
43.0	9.02	0.00	2.55	-8.00	0.845	0.000	0.270	0.783	-0.190	0.003	0.293	0.240	0.000
44.0	6.14	0.00	2.00	-6.00	0.452	0.000	0.300	0.540	-0.091	0.003	0.203	0.290	0.000
45.0	7.30	0.00	0.31	-10.00	0.790	0.000	0.034	0.707	-0.223	0.003	0.330	0.312	0.000
46.0	10.04	0.00	0.71	-9.00	1.193	0.000	0.077	1.190	-0.110	0.003	0.367	0.381	0.000
47.0	10.02	0.00	1.03	-8.71	1.191	0.000	0.113	1.190	-0.090	0.003	0.493	0.439	0.000
48.0	10.77	0.00	1.20	-8.30	1.170	0.000	0.137	1.122	-0.091	0.003	0.923	0.912	0.000
49.0	10.99	0.00	1.43	-2.00	1.191	0.000	0.150	1.101	-0.090	0.003	0.990	0.990	0.000
50.0	10.00	0.00	1.61	-2.10	1.163	0.000	0.170	1.190	-0.000	0.003	0.071	0.470	0.000
51.0	10.30	0.00	1.70	-2.00	1.120	0.000	0.170	1.100	-0.000	0.003	0.700	0.752	0.000
52.0	12.20	0.00	1.80	-2.00	1.110	0.000	0.212	1.130	-0.000	0.003	0.070	0.030	0.000
53.0	9.00	0.00	2.07	-0.00	1.070	0.000	0.220	1.007	-0.007	0.003	0.012	0.920	0.000
54.0	0.10	0.00	2.22	2.00	0.007	0.000	0.201	0.920	0.003	0.003	0.000	0.990	0.000
55.0	0.00	0.00	0.00	-0.00	0.000	0.000	0.000	0.000	0.000	0.000	1.000	1.000	0.000

500L2

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.0464
 SECONDARY MASS FLOW = 0.1294
 M-TOTAL = 0.172
 AT TEST SECTION M-TOTAL = 0.169
 M-TOT(1/TEST SEC)/M-TOT(1/INLET) = 1.097

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS = 0.0000	0.000	
M-BACK AT WALL = 0.0000	0.000	
TOTAL M-BACK = 0.0000	0.000	

MOMENTUM FLUXES

		DIMENSIONLESS
ANGULAR MOMENTUM FLUX = 0.000 N-M	0.000	
AXIAL MOMENTUM FLUX = 1.07 N	1.077	
PRESSURE FORCE = 0.102 N	0.099	
THRUST = 1.067 N	1.139	
SWIRL NUMBER =	0.000	
SWIRL NUMBER (U.R.T. THRUST) =	0.000	

ENERGY FLUXES

	J/S	DIMENSIONLESS
AXIAL KINETIC ENERGY FLUX = 0.91	1.197	
TAN KINETIC ENERGY FLUX = 0.00	0.000	
TOTAL KINETIC ENERGY FLUX = 0.91	1.197	
PRESSURE ENERGY FLUX = -0.05	-0.129	
TOTAL FLOW ENERGY FLUX = 0.86	1.119	

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
 VREF = 9.17 M/S BASED ON THROAT DIAMETER OF 0.0792 M
 REYNOLDS NO. = 0.044E 05

PROBE SITE 5
 PRIMARY TEMPERATURE = 91.9 C
 SECONDARY TEMPERATURE = 39.9 C
 BAROMETRIC PRESSURE = 799.3 TORR

W (MM)	U (M/S)	V (M/S)	W (M/S)	PSY-Pa (Pa)	COY91P	COY92P	COY93P	COY94P	SPY-Pa/PSY EXPY THIGRY	SPY-Pa/PSY EXPY THIGRY	SPY-Pa/PSY EXPY THIGRY	SPY-Pa/PSY EXPY THIGRY	SPY-Pa/PSY EXPY THIGRY
0.0	49.32	0.00	2.45	-220.41	1.304	0.000	0.045	1.310	-0.251	0.042	0.000	0.000	0.000
2.0	99.41	0.00	2.72	-197.94	1.337	0.000	0.072	1.339	-0.249	0.042	0.002	0.002	0.004
4.0	91.49	0.00	3.21	-201.10	1.370	0.000	0.060	1.373	-0.254	0.042	0.000	0.010	0.000
6.0	92.03	0.00	3.68	-183.70	1.401	0.000	0.094	1.409	-0.257	0.042	0.010	0.022	0.000
12.0	93.95	0.00	4.24	-204.05	1.421	0.000	0.113	1.430	-0.257	0.042	0.034	0.041	0.000
19.0	94.94	0.00	4.96	-214.40	1.444	0.000	0.127	1.452	-0.270	0.042	0.053	0.044	0.000
16.0	93.40	0.00	9.42	-247.47	1.424	0.000	0.144	1.431	-0.213	0.042	0.077	0.090	0.000
21.0	91.95	0.00	9.09	-189.00	1.367	0.000	0.199	1.374	-0.213	0.042	0.194	0.129	0.000
24.0	47.75	0.00	0.30	-246.22	1.267	0.000	0.147	1.278	-0.211	0.042	0.124	0.103	0.000
27.0	42.74	0.00	0.44	-234.41	1.124	0.000	0.171	1.140	-0.206	0.042	0.159	0.100	0.000
30.0	38.70	0.00	0.44	-242.54	0.978	0.000	0.171	0.990	-0.232	0.042	0.159	0.224	0.000
33.0	36.92	0.00	4.02	-229.44	0.012	0.000	0.140	0.424	-0.245	0.042	0.222	0.249	0.000
36.0	24.92	0.00	9.02	-293.90	0.490	0.000	0.144	0.440	-0.220	0.042	0.240	0.232	0.000
39.0	18.41	0.00	9.21	-242.10	0.440	0.000	0.141	0.900	-0.240	0.042	0.270	0.272	0.000
42.0	13.31	0.00	3.92	-222.12	0.290	0.000	0.144	0.370	-0.204	0.042	0.267	0.270	0.000
45.0	9.90	0.00	2.07	-226.40	0.227	0.000	0.090	0.224	-0.224	0.042	0.259	0.262	0.000
48.0	14.24	0.75	-0.09	-100.42	0.240	0.020	-0.240	0.490	-0.227	0.042	0.214	0.257	0.001
51.0	44.94	1.22	-1.41	-87.92	1.244	0.022	-0.027	1.247	-0.151	0.042	0.256	0.324	0.000
54.0	47.11	2.49	0.11	-94.21	1.294	0.077	0.092	1.297	-0.119	0.042	0.429	0.481	0.022
57.0	49.04	4.49	0.09	-80.17	1.227	0.119	0.024	1.243	-0.101	0.044	0.497	0.460	0.079
60.0	49.03	6.00	1.92	-87.40	1.119	0.102	0.040	1.220	-0.049	0.044	0.572	0.961	0.190
63.0	49.41	7.01	1.90	-94.27	1.200	0.202	0.092	1.224	-0.080	0.090	0.690	0.644	0.267
66.0	49.99	8.79	2.49	-22.23	1.199	0.232	0.000	1.219	-0.042	0.094	0.731	0.720	0.407
69.0	44.72	9.02	2.08	-21.23	1.104	0.243	0.079	1.220	-0.027	0.040	0.619	0.617	0.944
72.0	43.99	10.07	2.09	11.09	1.194	0.244	0.099	1.199	0.019	0.044	0.902	0.904	0.740
75.0	39.24	9.76	4.14	97.94	1.041	0.299	0.110	1.074	0.072	0.072	0.944	0.944	0.944
78.0	0.40	0.00	0.00	-0.04	0.000	0.000	0.000	0.000	0.000	0.000	1.000	1.000	1.000

S0541

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW M 0.2098
SECONDARY MASS FLOW M 0.5536
M-TOTAL M 0.768
AT TEST SECTION M-TOTAL M 0.767
M-FDITEST SECI/M-TOT(IALET) M 1.016

ACCELERATION

KG/S DIMENSIONLESS
M-BACK ON AXIS M 0.0000 0.000
M-BACK AT WALL M 0.0000 0.000
TOTAL M-BACK M 0.0000 0.000

MOMENTUM FLUXES

ANGULAR MOMENTUM FLUX M 0.249 N-m DIMENSIONLESS 0.111
AXIAL MOMENTUM FLUX M 32.86 N 1.100
PRESSURE FORCE M 1.075 N 0.078
THRUST M 39.093 N 1.212
SWIRL NUMBER M 0.097
SWIRL NUMBER (U.P.T. THRUST) M 0.092

ENERGY FLUXES

AXIAL KINETIC ENERGY FLUX M 701.33 J/S DIMENSIONLESS 1.000
TAN KINETIC ENERGY FLUX M 19.81 0.028
TOTAL KINETIC ENERGY FLUX M 721.91 1.000
PRESSURE ENERGY FLUX M -88.29 -0.127
TOTAL FLOW ENERGY FLUX M 633.62 1.271

MISCELLANEOUS DATA

PRESSURE AT WALL M 0.00 Pa
VREF M 27.76 M/S BASED ON THROAT DIAMETER OF 0.0762 M
REYNOLDS NO. M 0.164E 06

EXPERIMENT NO. 3091.2

PROBE SITE 3

PRIMARY TEMPERATURE = 60.0 C

SECONDARY TEMPERATURE = 32.0 C

BAROMETRIC PRESSURE = 758.8 TORR

[illegible]

SOSL2

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.0457
 SECONDARY MASS FLOW = 0.1234
 M-TOTAL = 0.169
 AT TEST SECTION M-TOTAL = 0.179
 M-TOT(TEST SEC)/M-TOT(INLET) = 1.050

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS	0.0000	0.000
M-BACK AT WALL	0.0000	0.000
TOTAL M-BACK	0.0000	0.000

MOMENTUM FLUXES

	KG/S	DIMENSIONLESS
ANGULAR MOMENTUM FLUX	0.010 N-M	0.001
AXIAL MOMENTUM FLUX	1.74 N	1.112
PRESSURE FORCE	0.104 N	0.066
THRUST	1.049 N	1.170
SWIRL NUMBER		0.073
SWIRL NUMBER (0.875 THRUST)		0.060

ENERGY FLUXES

	J/S	DIMENSIONLESS
AXIAL KINETIC ENERGY FLUX	0.03	1.203
TAN KINETIC ENERGY FLUX	0.11	0.019
TOTAL KINETIC ENERGY FLUX	0.05	1.315
PRESSURE ENERGY FLUX	-0.04	-0.121
TOTAL FLOW ENERGY FLUX	0.22	1.194

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
 VREF = 0.77 M/S BASED ON THROAT DIAMETER OF 0.0762 M
 REYNOLDS NO. = 5.10E 04

P438C SITE 1

PRIMARY TEMPERATURE = 48.8 C

SECONDARY TEMPERATURE = 32.8 C

BAROMETRIC PRESSURE = 749.8 TORR

H (MM)	U (M/S)	V (M/S)	W (M/S)	PST-Ps (PA)	U/VREF	W/VREF	V/VREF	WT/VREF	(PST-Ps)/PREF		STREAM	OR-FUNC	GT-F
									EXPT	THEORY			
0.0	48.68	0.00	2.24	-351.41	1.312	0.000	0.000	1.316	-0.448	-0.104	0.000	0.000	0.00
3.0	50.00	0.00	2.08	-344.09	1.348	0.000	0.072	1.349	-0.438	-0.104	0.002	0.002	0.00
6.0	51.70	0.00	3.20	-340.87	1.393	0.000	0.008	1.396	-0.408	-0.104	0.004	0.010	0.00
9.0	52.93	0.00	3.87	-353.50	1.426	0.000	0.099	1.430	-0.451	-0.104	0.019	0.023	0.00
12.0	53.31	0.00	4.23	-325.90	1.437	0.000	0.114	1.441	-0.419	-0.104	0.034	0.042	0.00
15.0	53.88	0.00	4.72	-335.71	1.492	0.000	0.127	1.498	-0.428	-0.104	0.053	0.067	0.00
18.0	53.28	0.00	5.32	-381.00	1.435	0.000	0.143	1.443	-0.408	-0.104	0.077	0.097	0.00
21.0	51.15	0.00	5.85	-389.12	1.376	0.000	0.158	1.387	-0.471	-0.104	0.105	0.131	0.00
24.0	47.15	0.00	6.17	-367.60	1.270	0.000	0.168	1.291	-0.488	-0.104	0.134	0.165	0.00
27.0	42.29	0.00	6.29	-388.30	1.140	0.000	0.168	1.192	-0.488	-0.104	0.165	0.198	0.00
30.0	36.47	0.00	6.10	-374.29	0.983	0.000	0.164	0.998	-0.477	-0.104	0.195	0.228	0.00
33.0	30.64	0.00	5.88	-383.48	0.818	0.000	0.194	0.825	-0.488	-0.104	0.223	0.264	0.00
36.0	13.93	0.00	5.18	-388.00	0.645	0.000	0.140	0.668	-0.484	-0.104	0.240	0.284	0.00
39.0	19.12	0.00	4.80	-371.07	0.488	0.000	0.124	0.504	-0.473	-0.104	0.269	0.279	0.00
42.0	11.49	1.08	3.72	-355.43	0.338	0.029	0.180	0.392	-0.453	-0.104	0.296	0.281	0.00
45.0	7.83	1.18	0.88	-355.84	0.214	0.032	0.028	0.218	-0.454	-0.103	0.290	0.284	0.00
48.0	19.89	3.35	-8.98	-237.80	0.467	0.090	-0.231	0.476	-0.303	-0.103	0.313	0.288	0.00
51.0	44.12	8.08	-1.85	-210.43	1.189	0.242	-0.090	1.214	-0.288	-0.090	0.394	0.325	0.02
54.0	44.44	11.48	-0.74	-189.45	1.187	0.310	-0.020	1.237	-0.284	-0.090	0.428	0.394	0.08
57.0	43.82	14.27	0.29	-182.45	1.183	0.385	0.008	1.244	-0.246	-0.077	0.488	0.488	0.12
60.0	43.88	18.77	0.87	-187.59	1.177	0.492	0.024	1.281	-0.214	-0.058	0.581	0.541	0.21
63.0	43.88	18.36	1.91	-132.45	1.183	0.922	0.041	1.293	-0.189	-0.039	0.638	0.620	0.31
66.0	44.34	21.62	2.17	-85.93	1.195	0.983	0.058	1.331	-0.110	-0.008	0.718	0.704	0.44
69.0	44.82	23.34	2.75	-82.88	1.211	0.830	0.074	1.387	-0.080	0.027	0.803	0.794	0.61
72.0	44.89	24.37	2.84	-21.78	1.218	0.857	0.071	1.378	-0.028	0.063	0.893	0.888	0.79
75.0	43.29	17.93	4.39	71.18	1.188	0.463	0.117	1.288	0.091	0.091	0.983	0.984	0.97
78.0	0.08	0.00	0.00	-8.38	0.068	0.000	0.000	0.000	0.000	0.000	1.000	1.000	1.00

5A0H1

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.2148
SECONDARY MASS FLOW = 0.3437
M-TOTAL = 0.738
AT TEST SECTION M-TOTAL = 0.771
M-TOT(TEST SEC)/M-TOT(INLET) = 1.017

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS = 0.0020	0.0020	0
M-BACK AT WALL = 0.0000	0.0000	0.000
TOTAL M-BACK = 0.0020	0.0020	0.000

MOMENTUM FLUXES

	KG/S	DIMENSIONLESS
ANGULAR MOMENTUM FLUX = 0.021 N-M	0.021	0.233
AXIAL MOMENTUM FLUX = 32.63 N	32.63	1.100
PRESSURE FORCE = 3.000 N	3.000	0.133
THRUST = 36.434 N	36.434	1.273
SWIRL NUMBER =		0.250
SWIRL NUMBER (U.P.T. THRUST) =		0.224

ENERGY FLUXES

	J/S	DIMENSIONLESS
AXIAL KINETIC ENERGY FLUX = 720.40	720.40	1.337
TAN KINETIC ENERGY FLUX = 52.39	52.39	0.174
TOTAL KINETIC ENERGY FLUX = 817.09	817.09	1.500
PRESSURE ENERGY FLUX = -120.84	-120.84	-0.244
TOTAL FLOW ENERGY FLUX = 686.25	686.25	1.256

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
VREF = 37.11 M/S BASED ON THROAT DIAMETER OF 0.0782 M
REYNOLDS NO. = 0.3422 00

EXPERIMENT NO. 910L2

PROBE SITE 5

PRIMARY TEMPERATURE = 62.0 C

SECONDARY TEMPERATURE = 33.0 C

BAROMETRIC PRESSURE = 756.5 TORR

R (IN)	U (M/S)	V (M/S)	W (M/S)	PST-PU (PA)	U/VREF	V/VREF	W/VREF	WT/VREF	(PST-PU)/PREV		STREAM	GX-FUNC	GY-FUNC
									EXPT	THEORY			
0.0	10.06	0.00	0.78	-10.00	1.230	0.000	0.017	1.233	-0.400	0.004	0.000	0.000	0.000
3.0	11.27	0.00	0.75	-10.01	1.264	0.000	0.004	1.267	-0.410	0.004	0.002	0.002	0.000
6.0	11.37	0.00	0.83	-10.40	1.275	0.000	0.006	1.279	-0.440	0.004	0.007	0.000	0.000
9.0	11.50	0.00	0.81	-10.07	1.289	0.000	0.103	1.293	-0.431	0.004	0.017	0.010	0.000
12.0	11.09	0.00	1.03	-10.30	1.340	0.000	0.110	1.345	-0.439	0.004	0.030	0.030	0.000
15.0	12.03	0.00	1.10	-10.32	1.340	0.000	0.134	1.390	-0.340	0.004	0.040	0.057	0.000
18.0	12.40	0.00	1.30	-22.14	1.390	0.000	0.140	1.390	-0.501	0.004	0.070	0.095	0.000
21.0	11.02	0.00	1.40	-10.00	1.325	0.000	0.104	1.330	-0.445	0.004	0.090	0.110	0.000
24.0	11.30	0.00	1.30	-10.00	1.275	0.000	0.170	1.280	-0.394	0.004	0.124	0.190	0.000
27.0	10.00	0.00	1.00	-10.57	1.100	0.000	0.100	1.212	-0.420	0.004	0.190	0.104	0.000
30.0	9.50	0.00	1.04	-10.50	0.971	0.000	0.103	1.007	-0.410	0.004	0.100	0.210	0.000
33.0	8.07	0.00	1.07	-10.27	0.900	0.000	0.170	0.922	-0.430	0.004	0.210	0.244	0.000
36.0	8.30	0.00	1.42	-10.00	0.713	0.000	0.190	0.731	-0.445	0.004	0.244	0.294	0.000
39.0	4.97	0.00	1.32	-17.37	0.994	0.000	0.147	0.977	-0.393	0.004	0.207	0.277	0.000
42.0	3.00	0.00	1.10	-10.00	0.432	0.000	0.120	0.491	-0.400	0.004	0.200	0.200	0.000
45.0	2.40	0.00	0.44	-10.00	0.200	0.000	0.040	0.204	-0.400	0.004	0.301	0.201	0.000
48.0	9.74	0.01	-1.30	-11.32	0.044	0.102	-0.150	0.070	-0.250	0.000	0.322	0.301	0.004
51.0	10.30	1.73	-0.37	-10.00	1.100	0.194	-0.041	1.177	-0.240	0.000	0.300	0.343	0.020
54.0	10.10	2.30	-0.12	-7.71	1.101	0.263	-0.013	1.171	-0.174	0.014	0.433	0.411	0.000
57.0	10.10	2.03	0.10	-0.00	1.104	0.320	0.010	1.100	-0.190	0.024	0.501	0.401	0.131
60.0	10.10	3.30	0.20	-0.17	1.133	0.370	0.032	1.100	-0.117	0.037	0.572	0.594	0.212
63.0	10.20	3.00	0.40	-0.00	1.100	0.440	0.051	1.230	-0.120	0.050	0.647	0.632	0.310
66.0	10.31	4.40	0.01	-2.70	1.190	0.903	0.000	1.203	-0.003	0.070	0.720	0.710	0.493
69.0	10.44	4.00	0.70	-0.00	1.171	0.931	0.003	1.204	-0.013	0.100	0.610	0.602	0.614
72.0	10.00	4.70	0.03	3.37	1.173	0.917	0.104	1.200	0.070	0.124	0.600	0.607	0.790
75.0	9.50	4.10	1.11	0.42	1.071	0.900	0.120	1.174	0.140	0.140	0.600	0.600	0.672
78.0	0.00	0.00	0.00	-0.00	0.000	0.000	0.000	0.000	0.000	0.000	1.000	1.000	1.000

S10L2

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.0494
 SECONDARY MASS FLOW = 0.1233
 M-TOTAL = 0.168
 AT TEST SECTION M-TOTAL = 0.161
 M-TOT(EST SEC)/M-TOT(INLET) = 1.073

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS	0.0000	0.000
M-BACK AT WALL	0.0000	0.000
TOTAL M-BACK	0.0000	0.000

MOMENTUM FLUXES

		DIMENSIONLESS
ANGULAR MOMENTUM FLUX	0.029 N-M	0.237
AXIAL MOMENTUM FLUX	1.78 N	1.102
PRESSURE FORCE	0.100 N	0.109
THRUST	1.940 N	1.207
SWIRL NUMBER		0.215
SWIRL NUMBER (V.R.T. THRUST)		0.106

ENERGY FLUXES

	J/S	DIMENSIONLESS
AXIAL KINETIC ENERGY FLUX	9.05	1.250
TAN KINETIC ENERGY FLUX	0.08	0.122
TOTAL KINETIC ENERGY FLUX	10.01	1.391
PRESSURE ENERGY FLUX	-1.38	-0.193
TOTAL FLOW ENERGY FLUX	8.62	1.198

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
 VREF = 8.92 M/S BASED ON THROAT DIAMETER OF 0.0762 M
 REYNOLDS NO. = 0.918E 05

[illegible]

S2011

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.2140
 SECONDARY MASS FLOW = 0.9976
 M-TOTAL = 0.773
 AT TEST SECTION M-TOTAL = 0.766
 M-T3(T/TEST SEC)/M-TOT(INLET) = 1.019

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS =	0.0000	0.000
M-BACK AT WALL =	0.0000	0.000
TOTAL M-BACK =	0.0000	0.000

MOMENTUM FLUXES

		DIMENSIONLESS
ANGULAR MOMENTUM FLUX =	1.238 N-m	0.991
AXIAL MOMENTUM FLUX =	33.78 N	1.142
PRESSURE FORCE =	9.189 N	0.311
THRUST =	42.888 N	1.493
SWIRL NUMBER =		0.482
SWIRL NUMBER (G.R.T. THRUST) =		0.379

ENERGY FLUXES

	J/S	DIMENSIONLESS
AXIAL KINETIC ENERGY FLUX =	799.99	1.382
TAN KINETIC ENERGY FLUX =	391.28	0.633
TOTAL KINETIC ENERGY FLUX =	1112.31	2.005
PRESSURE ENERGY FLUX =	-319.08	-0.568
TOTAL FLOW ENERGY FLUX =	797.31	1.437

MISCELLANEOUS DATA

PRESSURE AT WALL = 9.00 PA
 UREF = 37.82 M/S BASED ON THROAT DIAMETER OF 0.0762 M
 REYNOLDS NO. = 0.3876 94

W444IN31 A PITCH ANGLE OF -88.7 DEG. WAS CALCULATED AT M = 49.3 MP. THIS POINT HAS BEEN ELIMINATED.

EXPERIMENT NO. 320L2

PROBE SITE 9

PRIMARY TEMPERATURE = 32.0 C

SECONDARY TEMPERATURE = 32.0 C

BAROMETRIC PRESSURE = 750.5 TORR

Q (MW)	U (M/S)	V (M/S)	W (M/S)	PST-PP (PA)	U/VREF	V/VREF	W/VREF	WT/VREF	(PST-PP)/PREP EXPT THEORY	STREAM	OX-FUNC	GT-FUN
0.0	11.07	0.00	0.00	-44.47	1.242	0.000	0.074	1.244	-1.004 -0.570	0.000	0.000	0.000
3.0	11.10	0.00	0.07	-45.12	1.255	0.000	0.076	1.257	-1.010 -0.570	0.002	0.002	0.000
6.0	11.37	0.00	0.74	-41.63	1.278	0.010	0.084	1.278	-0.935 -0.570	0.007	0.004	0.000
9.0	11.09	0.00	0.03	-44.02	1.311	0.000	0.093	1.315	-1.007 -0.570	0.017	0.020	0.000
12.0	12.05	0.00	0.02	-44.53	1.352	0.000	0.104	1.358	-1.005 -0.570	0.030	0.038	0.000
15.0	12.23	0.00	1.05	-45.04	1.372	0.000	0.117	1.377	-1.031 -0.570	0.044	0.054	0.000
18.0	12.20	0.00	1.10	-44.13	1.385	0.000	0.132	1.378	-0.986 -0.570	0.070	0.085	0.000
21.0	11.93	0.00	1.20	-42.02	1.339	0.000	0.141	1.340	-0.957 -0.570	0.095	0.117	0.000
24.0	11.24	0.00	1.30	-38.15	1.261	0.000	0.153	1.270	-0.884 -0.570	0.124	0.150	0.000
27.0	10.39	0.00	1.39	-44.25	1.160	0.000	0.158	1.170	-0.909 -0.570	0.154	0.183	0.000
30.0	9.00	0.00	1.30	-42.12	1.010	0.000	0.152	1.022	-0.851 -0.570	0.184	0.212	0.000
33.0	7.78	0.00	1.27	-47.35	0.871	0.000	0.142	0.883	-1.003 -0.570	0.213	0.237	0.000
36.0	5.98	0.00	1.00	-44.91	0.683	0.000	0.122	0.689	-1.005 -0.570	0.239	0.255	0.000
39.0	4.15	0.00	0.94	-45.97	0.485	0.000	0.094	0.475	-1.030 -0.570	0.259	0.265	0.000
42.0	2.79	0.00	0.90	-42.80	0.313	0.000	0.057	0.310	-0.988 -0.570	0.274	0.271	0.000
45.0	1.70	0.00	-2.04	-37.48	0.047	0.301	-0.229	0.785	-0.848 -0.553	0.317	0.292	0.014
48.0	0.92	0.94	-1.08	-33.05	1.088	0.724	-0.121	1.302	-0.708 -0.511	0.361	0.329	0.049
54.0	10.01	7.08	-0.03	-25.01	1.124	0.882	-0.093	1.410	-0.903 -0.438	0.423	0.390	0.114
57.0	10.44	8.39	-0.49	-22.70	1.171	0.942	-0.059	1.504	-0.913 -0.345	0.491	0.461	0.231
60.0	10.73	4.69	-0.24	-17.25	1.204	0.979	-0.020	1.549	-0.900 -0.241	0.565	0.540	0.307
63.0	10.70	0.90	-0.01	-11.49	1.211	0.983	-0.001	1.567	-0.880 -0.153	0.644	0.627	0.420
66.0	10.70	0.97	0.21	-5.55	1.109	0.902	0.023	1.545	-0.103 -0.004	0.727	0.710	0.557
69.0	10.07	0.40	0.01	-5.00	1.197	0.952	0.048	1.490	-0.115 0.020	0.814	0.812	0.690
72.0	10.31	0.20	0.03	-0.44	1.197	0.920	0.071	1.408	-0.010 0.017	0.903	0.900	0.847
75.0	0.04	0.01	0.04	7.01	0.992	0.775	0.100	1.203	0.190 0.150	0.987	0.960	0.931
78.0	0.00	0.00	0.00	-0.00	0.000	0.000	0.000	-0.000	0.000 0.000	1.000	1.000	1.000

S20L2

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.0455
 SECONDARY MASS FLOW = 0.1235
 M-TOTAL = 0.169
 AT TEST SECTION M-TOTAL = 0.161
 M-TOT(1/2 TEST SECT)/M-TOT(INLET) = 1.073

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS	0.0000	0.000
M-BACK AT WALL	0.0000	0.000
TOTAL M-BACK	0.0000	0.000

MOMENTUM FLUXES

		DIMENSIONLESS
ANGULAR MOMENTUM FLUX	0.004 N-M	0.918
AXIAL MOMENTUM FLUX	1.79 N	1.106
PRESSURE FORCE	0.457 N	0.263
THRUST	2.244 N	1.389
SWIRL NUMBER		0.468
SWIRL NUMBER (W.R.T. THRUST)		0.373

ENERGY FLUXES

	J/S	DIMENSIONLESS
AXIAL KINETIC ENERGY FLUX	9.19	1.271
TAN KINETIC ENERGY FLUX	4.08	0.564
TOTAL KINETIC ENERGY FLUX	13.28	1.849
PRESSURE ENERGY FLUX	-3.76	-0.520
TOTAL FLOW ENERGY FLUX	9.52	1.329

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
 VREF = 1.01 M/S BASED ON THROAT DIAMETER OF 0.0762 M
 REYNOLDS NO. = 0.918E 05

PROBE SITE 1

PRIMARY TEMPERATURE = 48.0 C

SECONDARY TEMPERATURE = 38.0 C

BAROMETRIC PRESSURE = 780.0 TORR

Q (MM)	U (M/S)	V (M/S)	W (M/S)	PST-P0 (PA)	U/VREF	W/VREF	V/VREF	WT/VREF	1PST-P01/PREF EXPT	THEORY	STREAM	EX-FUNC	ST-FUN
0.0	49.23	0.00	3.09	-1019.48	1.282	0.000	0.074	1.264	-1.102	-1.277	0.000	0.000	0.000
3.0	50.34	0.00	3.22	-1017.44	1.295	0.000	0.093	1.294	-1.107	-1.277	0.002	0.002	0.000
6.0	52.23	0.00	3.74	-1014.00	1.339	0.000	0.096	1.342	-1.107	-1.277	0.000	0.000	0.000
9.0	53.24	0.00	4.20	-1004.92	1.389	0.000	0.109	1.389	-1.104	-1.277	0.010	0.021	0.000
12.0	54.03	0.00	4.81	-999.51	1.395	0.000	0.123	1.390	-1.159	-1.277	0.033	0.039	0.000
15.0	54.40	0.00	5.41	-999.43	1.409	0.000	0.139	1.411	-1.170	-1.277	0.092	0.082	0.000
18.0	54.43	0.00	5.99	-1021.47	1.399	0.000	0.153	1.404	-1.195	-1.277	0.075	0.090	0.000
21.0	52.01	0.00	6.48	-1039.44	1.393	0.000	0.166	1.384	-1.212	-1.277	0.102	0.122	0.000
24.0	48.05	0.00	6.81	-1042.91	1.273	0.000	0.179	1.294	-1.220	-1.277	0.131	0.150	0.000
27.0	44.74	0.00	6.87	-1083.98	1.147	0.000	0.179	1.160	-1.241	-1.277	0.102	0.108	0.000
30.0	39.34	0.00	6.89	-1090.29	1.013	0.000	0.177	1.020	-1.270	-1.277	0.193	0.217	0.000
33.0	32.33	0.00	6.43	-1070.21	0.844	0.000	0.169	0.860	-1.299	-1.277	0.222	0.241	0.000
36.0	27.01	0.00	9.72	-1001.09	0.892	0.000	0.147	0.708	-1.269	-1.277	0.240	0.299	0.000
39.0	11.09	0.00	4.69	-1079.97	0.939	0.000	0.124	0.994	-1.290	-1.277	0.271	0.271	0.000
42.0	19.46	0.59	3.98	-1071.20	0.461	0.014	0.102	0.414	-1.294	-1.277	0.290	0.279	0.000
45.0	9.92	2.77	0.93	-1073.99	0.244	0.071	0.014	0.294	-1.296	-1.277	0.304	0.283	0.000
48.0	10.74	19.07	-9.61	-1022.80	0.429	0.386	-0.144	0.999	-1.197	-1.267	0.320	0.290	0.004
51.0	29.93	34.04	-3.15	-924.02	0.790	0.872	-0.001	1.199	-1.002	-1.213	0.391	0.300	0.023
54.0	34.90	44.27	-2.00	-794.03	0.837	1.135	-0.091	1.441	-0.983	-1.090	0.390	0.330	0.000
57.0	40.44	51.09	-0.11	-687.10	1.042	1.309	-0.003	1.673	-0.701	-0.932	0.492	0.380	0.133
60.0	49.33	54.23	1.53	-910.69	1.168	1.390	0.030	1.619	-0.690	-0.743	0.920	0.491	0.227
63.0	49.94	59.40	3.14	-378.00	1.270	1.420	0.041	1.907	-0.443	-0.940	0.990	0.939	0.340
66.0	52.41	54.69	4.91	-207.73	1.343	1.401	0.110	1.944	-0.313	-0.380	0.607	0.830	0.410
69.0	93.07	93.00	9.37	-100.70	1.300	1.360	0.130	1.920	-0.129	-0.107	0.702	0.740	0.642
72.0	92.93	92.01	9.90	-94.40	1.397	1.333	0.100	1.909	-0.004	-0.030	0.463	0.600	0.000
75.0	40.41	47.05	8.48	90.02	1.243	1.271	0.117	1.790	0.100	0.100	0.994	0.902	0.974
78.0	0.00	0.00	0.00	-0.00	0.000	0.000	0.000	0.000	0.000	0.000	1.000	1.000	1.000

S30 H1

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.2130
 SECONDARY MASS FLOW = 0.5524
 M-TOTAL = 0.766
 AT TEST SECTION M-TOTAL = 0.799
 M-TOT/TEST SECI/M-TOT(INLET) = 1.043.

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS	0.0000	0.000
M-BACK AT WALL	0.0000	0.000
TOTAL M-BACK	0.0000	0.000

MOMENTUM FLUXES

		DIMENSIONLESS
ANGULAR MOMENTUM FLUX	1.785 N-M	0.751
AXIAL MOMENTUM FLUX	34.75 N	1.147
PRESSURE FORCE	11.971 N	0.384
THRUST	47.717 N	1.931
SWIRL NUMBER		0.695
SWIRL NUMBER (W.R.T. THRUST)		0.491

ENERGY FLUXES

	J/S	DIMENSIONLESS
AXIAL KINETIC ENERGY FLUX	848.83	1.391
TAN KINETIC ENERGY FLUX	709.88	1.181
TOTAL KINETIC ENERGY FLUX	1558.70	2.569
PRESSURE ENERGY FLUX	-488.87	-0.672
TOTAL FLOW ENERGY FLUX	1153.40	1.897

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
 VREF = 39.82 M/S BASED ON THROAT DIAMETER OF 0.0762 M
 REYNOLDS NO. = 0.402E 06

EXPERIMENT NO. 5326

PROBE SITE 3

PRIMARY TEMPERATURE = 55.0 C

SECONDARY TEMPERATURE = 31.0 C

BAROMETRIC PRESSURE = 753.5 TORR

H (MM)	U (M/S)	V (M/S)	W (M/S)	PST-PW (PA)	U/VREF	V/VREF	W/VREF	WT/VREF	(PST-PW)/PREF		STREAM	GR-FUNC	GT-FU
									EXPT	THEORY			
0.0	10.78	0.00	0.05	-50.10	1.228	0.000	0.101	1.228	-1.374	-1.500	0.000	0.000	0.000
3.0	10.85	0.00	0.00	-50.51	1.235	0.000	0.108	1.235	-1.535	-1.500	0.002	0.002	0.000
6.0	10.83	0.00	0.06	-50.66	1.232	0.000	0.115	1.237	-1.492	-1.500	0.004	0.004	0.000
9.0	10.88	0.00	1.04	-50.10	1.310	0.000	0.124	1.310	-1.477	-1.500	0.017	0.019	0.000
12.0	11.19	0.00	1.17	-50.66	1.335	0.000	0.140	1.343	-1.538	-1.500	0.031	0.035	0.000
15.0	11.44	0.00	1.31	-50.40	1.385	0.000	0.157	1.374	-1.432	-1.500	0.049	0.055	0.000
18.0	11.40	0.00	1.44	-51.40	1.380	0.000	0.171	1.370	-1.559	-1.500	0.071	0.081	0.000
21.0	10.90	0.00	1.01	-50.50	1.301	0.000	0.132	1.315	-1.637	-1.500	0.090	0.111	0.000
24.0	10.00	0.00	1.00	-51.81	1.195	0.000	0.201	1.210	-1.310	-1.500	0.123	0.140	0.000
27.0	9.10	0.00	1.75	-50.52	1.015	0.000	0.209	1.108	-1.404	-1.500	0.192	0.181	0.000
30.0	8.33	0.00	1.75	-50.42	0.883	0.000	0.209	1.015	-1.507	-1.500	0.181	0.194	0.000
33.0	8.06	0.00	1.87	-50.47	0.820	0.000	0.200	0.852	-1.443	-1.500	0.209	0.216	0.000
36.0	9.56	0.00	1.85	-50.85	0.884	0.000	0.197	0.892	-1.543	-1.500	0.234	0.232	0.000
39.0	4.22	0.00	1.54	-50.72	0.563	0.000	0.144	0.536	-1.440	-1.500	0.255	0.243	0.000
42.0	2.87	0.15	1.55	-50.44	0.343	0.030	0.195	0.391	-1.442	-1.507	0.272	0.250	0.000
45.0	3.42	0.77	-0.10	-51.30	0.170	0.092	-0.012	0.194	-1.556	-1.507	0.283	0.252	0.001
48.0	4.12	4.28	-0.24	-50.80	0.482	0.511	-0.112	0.710	-1.412	-1.491	0.298	0.299	0.000
51.0	8.49	8.08	-0.47	-51.20	0.775	0.943	-0.090	1.237	-1.300	-1.410	0.330	0.277	0.020
54.0	7.89	10.20	-0.18	-53.40	0.817	1.217	-0.021	1.726	-1.183	-1.279	0.377	0.311	0.071
57.0	8.03	11.68	3.10	-38.74	1.054	1.391	0.021	1.747	-0.922	-1.090	0.436	0.381	0.139
60.0	9.95	12.29	0.52	-27.39	1.187	1.488	0.002	1.817	-0.884	-0.878	0.505	0.429	0.234
63.0	10.01	12.47	0.88	-20.17	1.302	1.487	0.103	1.970	-0.911	-0.850	0.586	0.510	0.393
66.0	11.90	12.24	1.22	-14.91	1.371	1.480	0.140	2.089	-0.370	-0.430	0.670	0.622	0.402
69.0	11.70	12.01	1.45	-10.42	1.403	1.433	0.173	2.013	-0.289	-0.239	0.777	0.741	0.503
72.0	11.57	11.46	1.07	-3.08	1.381	1.390	0.200	1.970	-0.070	-0.000	0.881	0.888	0.510
75.0	10.47	10.33	2.00	2.38	1.243	1.732	0.240	1.772	0.000	0.000	0.993	0.982	0.975
78.0	0.00	0.00	0.00	-9.90	0.003	0.000	0.000	0.000	0.000	0.000	1.000	1.000	1.000

S30LA

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.0498
 SECONDARY MASS FLOW = 0.1229
 M-TOTAL = 0.189
 AT TEST SECTION M-TOTAL = 0.172
 M-TOT(1/TEST SECT)/M-TOT(1/INLET) = 1.019

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS = 0.0300	0.030	
M-BACK AT WALL = 0.0086	0.030	
TOTAL M-BACK = 0.0386	0.030	

MOMENTUM FLUXES

	KG/S	DIMENSIONLESS
ANGULAR MOMENTUM FLUX = 0.009 N-M	0.010	
AXIAL MOMENTUM FLUX = 1.87 N	1.199	
PRESSURE FORCE = 0.875 N	0.449	
THRUST = 2.342 N	1.028	
SWIRL NUMBER =	0.702	
SWIRL NUMBER (I.O.P.T. THRUST) =	0.996	

ENERGY FLUXES

	J/S	DIMENSIONLESS
AXIAL KINETIC ENERGY FLUX = 9.59	1.410	
TAN KINETIC ENERGY FLUX = 7.98	1.320	
TOTAL KINETIC ENERGY FLUX = 16.86	2.783	
PRESSURE ENERGY FLUX = -4.92	-0.915	
TOTAL FLOW ENERGY FLUX = 11.79	1.868	

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
 VREF = 8.38 M/S BASED ON THROAT DIAMETER OF 0.0762 M
 REYNOLDS NO. = 0.443E+05

PROBE SITE 5

PRIMARY TEMPERATURE = 46.0 C

SECONDARY TEMPERATURE = 37.0 C

BAROMETRIC PRESSURE = 760.0 TORR

H (MM)	U (M/S)	V (M/S)	W (M/S)	PST-PU (PA)	U/VREF	V/VREF	W/VREF	WT/VREF	(PST-PU)/PREF		STREAM	GR-FUNC	GT-FU
									EXPT	THEORY			
0.0	40.46	0.00	3.82	-1080.85	1.190	0.000	0.000	1.202	-1.193	-1.656	0.000	0.000	0.000
3.0	39.75	0.00	4.10	-1104.70	1.230	0.000	0.000	1.234	-1.190	-1.656	0.002	0.002	0.000
6.0	32.44	0.00	4.50	-1147.91	1.271	0.000	0.111	1.276	-1.204	-1.656	0.004	0.004	0.000
9.0	33.77	0.00	9.11	-1134.30	1.303	0.000	0.124	1.309	-1.190	-1.656	0.017	0.010	0.000
12.0	34.74	0.00	9.75	-1144.20	1.327	0.000	0.138	1.330	-1.200	-1.656	0.031	0.034	0.000
15.0	35.17	0.00	8.30	-1110.15	1.337	0.000	0.153	1.345	-1.173	-1.656	0.043	0.054	0.000
18.0	35.04	0.00	8.87	-1140.04	1.334	0.000	0.166	1.344	-1.187	-1.656	0.071	0.079	0.000
21.0	33.88	0.00	7.92	-1150.39	1.301	0.000	0.142	1.313	-1.215	-1.656	0.097	0.107	0.000
24.0	31.43	0.00	8.10	-1198.04	1.247	0.000	0.156	1.263	-1.296	-1.656	0.124	0.137	0.000
27.0	48.75	0.00	8.21	-1177.37	1.133	0.000	0.150	1.150	-1.230	-1.656	0.150	0.166	0.000
30.0	41.00	0.00	8.04	-1100.95	1.013	0.000	0.155	1.031	-1.247	-1.656	0.167	0.199	0.000
33.0	35.04	0.00	7.50	-1192.00	0.871	0.000	0.164	0.890	-1.291	-1.656	0.217	0.219	0.000
36.0	30.35	0.00	6.97	-1209.47	0.735	0.000	0.169	0.794	-1.290	-1.656	0.244	0.237	0.000
39.0	24.55	1.50	6.33	-1203.92	0.595	0.030	0.193	0.619	-1.263	-1.656	0.269	0.291	0.000
42.0	19.44	2.00	5.67	-1209.42	0.478	0.050	0.137	0.488	-1.200	-1.656	0.291	0.281	0.001
45.0	14.90	0.70	5.33	-1213.01	0.361	0.010	0.120	0.384	-1.273	-1.656	0.309	0.297	0.001
48.0	10.26	0.00	2.21	-1279.06	0.249	0.141	0.054	0.291	-1.330	-1.656	0.323	0.271	0.002
51.0	10.23	20.50	-1.07	49.73	0.442	0.443	-0.026	0.701	0.048	-1.628	0.341	0.277	0.000
54.0	10.90	44.80	-8.04	-1047.90	0.854	1.000	-0.019	1.280	-1.000	-1.937	0.371	0.291	0.020
57.0	30.25	59.19	1.52	-1210.14	0.878	1.433	0.037	1.001	-1.904	-1.363	0.416	0.320	0.076
60.0	46.05	57.00	4.83	-807.30	1.116	1.823	0.112	1.973	-0.700	-1.121	0.477	0.372	0.155
63.0	54.04	70.42	7.72	-483.50	1.300	1.700	0.187	2.190	-0.907	-0.647	0.555	0.453	0.272
66.0	50.80	70.30	10.00	-321.93	1.420	1.703	0.242	2.237	-0.337	-0.973	0.647	0.550	0.410
69.0	62.01	60.87	11.47	-219.00	1.503	1.860	0.270	2.263	-0.228	-0.316	0.751	0.606	0.590
72.0	63.85	69.81	12.44	-89.13	1.542	1.997	0.302	2.261	-0.093	-0.009	0.864	0.620	0.770
75.0	60.00	61.94	13.70	100.00	1.471	1.491	0.334	2.121	0.114	0.114	0.901	0.976	0.940
78.0	0.00	0.00	0.00	-0.00	0.000	0.000	0.000	0.000	0.000	0.000	1.000	1.000	1.000

540-HA

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.2136
 SECONDARY MASS FLOW = 0.5515
 M-TOTAL = 0.765
 AT TEST SECTION M-TOTAL = 0.063
 M-TOT(1/TEST SEC)/M-TOT(1/INLET) = 1.131

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS = 0.0000	0.000	0.000
M-BACK AT WALL = 0.0000	0.000	0.000
TOTAL M-BACK = 0.0000	0.000	0.000

MOMENTUM FLUXES

	KG/S	DIMENSIONLESS
ANGULAR MOMENTUM FLUX = 2.406 N-M	0.000	0.000
AXIAL MOMENTUM FLUX = 41.80 N	1.198	1.198
PRESSURE FORCE = 13.073 N	0.399	0.399
THRUST = 95.468 N	1.595	1.595
SWIRL NUMBER =	0.759	0.759
SWIRL NUMBER (G.M.T. THRUST) =	0.900	0.900

ENERGY FLUXES

	J/S	DIMENSIONLESS
AXIAL KINETIC ENERGY FLUX = 1112.02	1.595	1.595
TAN KINETIC ENERGY FLUX = 1100.70	1.696	1.696
TOTAL KINETIC ENERGY FLUX = 2230.10	3.293	3.293
PRESSURE ENERGY FLUX = -099.02	-0.691	-0.691
TOTAL FLOW ENERGY FLUX = 1030.27	2.962	2.962

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
 VREF = 41.27 M/S BASED ON THROAT DIAMETER OF 0.0762 M
 REYNOLDS NO. = 0.425E 06

EXPERIMENT NO. 54011

PROB. SITE 5

PRIMARY TEMPERATURE = 55.6 C

SECONDARY TEMPERATURE = 31.0 C

BAROMETRIC PRESSURE = 753.5 TORR

Q (MM)	U (M/S)	D (M/S)	V (M/S)	PST-PU (PA)	U/VREF	U/VREF	V/VREF	VT/VREF	(PST-PU)/PREP EXPT THEORY	STREAM	SI-FUNC	GT-FUNC
0.0	10.76	0.00	0.91	-66.95	1.225	0.000	0.104	1.225	-1.459 -1.626	0.000	0.000	0.000
3.0	10.67	0.00	0.93	-69.10	1.213	0.000	0.109	1.217	-1.456 -1.626	0.002	0.002	0.000
6.0	10.63	0.00	0.96	-69.38	1.230	0.000	0.110	1.235	-1.507 -1.626	0.007	0.007	0.000
9.0	11.03	0.00	1.03	-69.72	1.254	0.000	0.117	1.259	-1.517 -1.626	0.016	0.017	0.000
12.0	11.17	0.00	1.13	-66.36	1.268	0.000	0.128	1.278	-1.532 -1.626	0.029	0.030	0.000
15.0	11.12	0.00	1.27	-66.96	1.263	0.000	0.149	1.271	-1.497 -1.626	0.046	0.047	0.000
18.0	10.90	0.00	1.38	-64.23	1.239	0.000	0.157	1.246	-1.483 -1.626	0.060	0.060	0.000
21.0	11.03	0.00	1.80	-69.41	1.293	0.000	0.161	1.286	-1.510 -1.626	0.089	0.092	0.000
24.0	10.79	0.00	1.81	-69.45	1.226	0.000	0.208	1.243	-1.603 -1.626	0.117	0.120	0.000
27.0	10.02	0.00	1.83	-103.79	1.130	0.000	0.215	1.139	-4.242 -1.626	0.146	0.149	0.000
30.0	9.00	0.00	1.87	-78.74	1.023	0.000	0.213	1.049	-1.617 -1.626	0.176	0.179	0.000
33.0	7.72	0.00	1.80	-68.73	0.877	0.000	0.205	0.901	-1.508 -1.626	0.205	0.190	0.000
36.0	6.54	0.00	1.72	-68.60	0.744	0.000	0.196	0.780	-1.563 -1.626	0.232	0.216	0.000
39.0	4.76	0.00	1.88	-64.33	0.541	0.001	0.198	0.980	-1.409 -1.626	0.255	0.229	0.000
42.0	3.80	0.00	1.47	-67.22	0.432	0.100	0.168	0.474	-1.992 -1.626	0.274	0.237	0.001
45.0	2.84	0.47	1.51	-65.28	0.322	0.094	0.171	0.389	-1.906 -1.626	0.296	0.242	0.002
48.0	1.93	1.05	0.87	-68.47	0.220	0.119	0.099	0.269	-1.534 -1.626	0.302	0.244	0.003
51.0	4.02	0.03	-0.83	-64.74	0.457	0.885	-0.003	0.413	-1.494 -1.704	0.320	0.290	0.009
54.0	5.44	0.95	0.12	-55.85	0.683	1.130	0.014	1.311	-1.289 -1.692	0.391	0.265	0.031
57.0	7.87	12.04	0.57	-47.86	0.894	1.471	0.065	1.723	-1.103 -1.502	0.397	0.295	0.077
60.0	10.00	14.71	1.15	-38.10	1.138	1.672	0.131	2.025	-0.833 -1.241	0.441	0.340	0.157
63.0	11.71	19.56	1.74	-28.32	1.331	1.766	0.190	2.220	-0.607 -0.945	0.541	0.432	0.273
66.0	12.69	19.53	2.19	-18.88	1.465	1.765	0.249	2.308	-0.436 -0.647	0.637	0.543	0.421
69.0	13.40	19.21	2.47	-7.70	1.930	1.729	0.291	2.326	-0.170 -0.387	0.749	0.678	0.932
72.0	13.61	14.69	2.70	-3.43	1.969	1.669	0.308	2.308	-0.079 -0.115	0.861	0.829	0.780
75.0	13.69	13.51	3.00	0.39	1.440	1.939	0.341	2.105	0.101 0.101	0.966	0.979	0.966
78.0	0.00	0.00	0.00	-0.00	0.000	0.000	0.000	0.000	0.000 0.000	1.000	1.000	1.000

S4061.

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.0499
 SECONDARY MASS FLOW = 0.1229
 M-TOTAL = 0.199
 AT TEST SECTION M-TOTAL = 0.199
 M-TOT(1/TEST SECI/M-TOT(INLET)) = 1.067

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS = 0.0000	0.000	
M-BACK AT WALL = 0.0000	0.000	
TOTAL M-BACK = 0.0000	0.000	

MOMENTUM FLUXES

		DIMENSIONLESS
ANGULAR MOMENTUM FLUX = 0.117 N-M		0.871
AXIAL MOMENTUM FLUX = 1.91 N		1.231
PRESSURE FORCE = 0.034 N		0.941
THRUST = 2.789 N		1.782
SWIRL NUMBER =		0.882
SWIRL NUMBER (0.882 THRUST) =		0.994

ENERGY FLUXES

	J/S	DIMENSIONLESS
AXIAL KINETIC ENERGY FLUX = 11.08		1.991
TAN KINETIC ENERGY FLUX = 12.79		1.833
TOTAL KINETIC ENERGY FLUX = 24.17		3.479
PRESSURE ENERGY FLUX = -0.38		-0.914
TOTAL FLOW ENERGY FLUX = 17.61		2.981

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
 VREF = 0.06 M/S BASED ON THROAT DIAMETER OF 0.0762 M
 REYNOLDS NO. = 0.905E 05

PHONE SITE 5

PRIMARY TEMPERATURE = 49.0 C

SECONDARY TEMPERATURE = 34.0 C

BAROMETRIC PRESSURE = 761.7 TORR

R (MM)	U (M/S)	V (M/S)	W (M/S)	PST-P0 (PA)	U/VREF	V/VREF	W/VREF	VT/VREF	(PST-P0)/PREF		STREAM	GX-FUNC	GY-FUN
									EXPT	THEORY			
0.0	49.20	0.00	3.97	-1120.12	1.234	0.000	0.000	1.234	-1.247	-1.745	0.000	0.000	0.000
3.0	50.53	0.00	3.99	-1114.99	1.248	0.000	0.100	1.272	-1.241	-1.745	0.002	0.002	0.000
6.0	52.15	0.00	4.52	-1107.03	1.300	0.000	0.113	1.313	-1.233	-1.745	0.000	0.000	0.000
9.0	53.00	0.00	5.07	-1120.70	1.350	0.000	0.127	1.358	-1.254	-1.745	0.010	0.010	0.000
12.0	54.00	0.00	5.05	-1119.90	1.379	0.000	0.142	1.388	-1.240	-1.745	0.032	0.030	0.000
15.0	55.74	0.00	6.28	-1146.47	1.400	0.000	0.197	1.400	-1.270	-1.745	0.051	0.057	0.000
18.0	55.59	0.00	6.95	-1113.04	1.389	0.000	0.174	1.400	-1.230	-1.745	0.074	0.084	0.000
21.0	54.07	0.00	7.53	-1103.71	1.372	0.000	0.180	1.385	-1.204	-1.745	0.101	0.115	0.000
24.0	52.14	0.00	8.00	-1100.55	1.309	0.000	0.201	1.324	-1.325	-1.745	0.132	0.149	0.000
27.0	44.39	0.00	8.22	-1100.13	1.213	0.000	0.200	1.230	-1.324	-1.745	0.104	0.103	0.000
30.0	43.10	0.00	8.12	-1213.59	1.091	0.000	0.204	1.101	-1.391	-1.745	0.197	0.214	0.000
33.0	37.91	0.00	7.09	-1212.43	0.941	0.000	0.192	0.961	-1.349	-1.745	0.220	0.240	0.000
36.0	31.00	0.55	7.13	-1210.72	0.790	0.014	0.179	0.810	-1.354	-1.745	0.250	0.262	0.000
39.0	25.04	1.75	6.20	-1190.35	0.620	0.044	0.190	0.690	-1.334	-1.745	0.200	0.270	0.001
42.0	20.00	2.04	5.05	-1200.00	0.504	0.051	0.142	0.520	-1.340	-1.744	0.300	0.269	0.001
45.0	10.50	0.03	6.33	-1120.10	0.245	0.021	0.199	0.300	-1.254	-1.744	0.325	0.294	0.002
48.0	9.53	4.03	2.93	-1247.34	0.230	0.110	0.074	0.270	-1.300	-1.743	0.330	0.297	0.002
51.0	10.42	24.01	-0.94	-1220.00	0.412	0.010	-0.024	0.743	-1.300	-1.720	0.393	0.302	0.007
54.0	14.00	42.00	-0.79	-1003.40	0.600	1.004	-0.020	1.214	-1.104	-1.630	0.301	0.314	0.020
57.0	23.29	50.44	1.20	-005.19	0.830	1.410	0.030	1.604	-0.904	-1.440	0.423	0.339	0.010
60.0	41.07	09.07	4.11	-001.70	1.053	1.053	0.103	1.902	-0.750	-1.221	0.400	0.305	0.143
63.0	50.00	09.77	7.29	-400.00	1.272	1.790	0.102	2.171	-0.944	-0.930	0.950	0.430	0.250
66.0	54.90	70.35	9.01	-322.74	1.410	1.705	0.240	2.270	-0.350	-0.644	0.647	0.300	0.402
69.0	60.12	09.10	11.47	-201.30	1.500	1.730	0.200	2.317	-0.224	-0.307	0.790	0.007	0.570
72.0	61.90	07.17	12.00	-04.02	1.904	1.600	0.310	2.390	-0.100	-0.113	0.004	0.030	0.770
75.0	50.93	02.10	14.03	95.02	1.070	1.990	0.392	2.177	0.100	0.100	0.901	0.970	0.900
78.0	0.00	0.00	0.00	-0.00	0.000	0.000	0.000	0.000	0.000	0.000	1.000	1.000	1.000

54541

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.2848
 SECONDARY MASS FLOW = 0.9993
 M-TOTAL = 0.781
 AT TEST SECTION M-TOTAL = 0.822
 M-TOT(TEST SECT/M-TOT(INLET) = 1.000

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS = 0.0000	0.000	
M-BACK AT WALL = 0.0000	0.000	
TOTAL M-BACK = 0.0000	0.000	

MOMENTUM FLUXES

	KG/S	DIMENSIONLESS
ANGULAR MOMENTUM FLUX = 2.303 N-M	0.825	
AXIAL MOMENTUM FLUX = 39.56 N	1.207	
PRESSURE FORCE = 14.371 N	0.438	
THRUST = 93.938 N	1.849	
SWIRL NUMBER =	0.768	
SWIRL NUMBER (U.M.T. THRUST) =	0.962	

ENERGY FLUXES

	J/S	DIMENSIONLESS
AXIAL KINETIC ENERGY FLUX = 1030.09	1.577	
TAN KINETIC ENERGY FLUX = 1136.09	1.748	
TOTAL KINETIC ENERGY FLUX = 2166.09	3.368	
PRESSURE ENERGY FLUX = -460.97	-0.736	
TOTAL FLOW ENERGY FLUX = 1719.39	2.632	

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
 VREF = 39.68 M/S BASED ON THROAT DIAMETER OF 0.0763 M
 REYNOLDS NO. = 0.418E 06

P430E SITE 5

PRIMARY TEMPERATURE = 60.0 C

SECONDARY TEMPERATURE = 32.0 C

BAROMETRIC PRESSURE = 753.5 TORR

Z (MM)	U (M/S)	V (M/S)	W (M/S)	PST-PR (PA)	U/VREF	V/VREF	W/VREF	VT/VREF	(PST-PR)/PREF		STREAN	GX-FUNC	GY-FUN
									EXPT	THEORY			
0.0	10.93	0.00	0.93	-87.17	1.206	0.000	0.102	1.210	-1.489	-1.888	0.000	0.000	0.000
3.0	10.74	0.00	0.93	-88.10	1.149	0.000	0.103	1.169	-1.442	-1.899	0.002	0.092	0.000
6.0	10.64	0.00	1.02	-88.92	1.196	0.000	0.112	1.201	-1.503	-1.888	0.007	0.007	0.000
9.0	10.78	0.00	1.04	-89.08	1.199	0.000	0.114	1.198	-1.418	-1.889	0.016	0.019	0.000
12.0	10.84	0.00	1.15	-83.98	1.207	0.000	0.127	1.213	-1.389	-1.899	0.028	0.027	0.000
15.0	11.03	0.00	1.26	-88.73	1.217	0.000	0.139	1.229	-1.498	-1.899	0.044	0.043	0.000
18.0	11.27	0.00	1.42	-73.83	1.244	0.000	0.196	1.293	-1.488	-1.899	0.084	0.083	0.000
21.0	10.94	0.00	1.80	-84.21	1.207	0.000	0.178	1.220	-1.401	-1.899	0.097	0.088	0.000
24.0	10.90	0.00	1.70	-84.11	1.199	0.000	0.188	1.174	-1.398	-1.899	0.113	0.111	0.000
27.0	9.98	0.00	1.83	-79.43	1.101	0.000	0.202	1.120	-1.898	-1.899	0.141	0.137	0.000
30.0	9.27	0.00	1.82	-78.28	1.023	0.000	0.201	1.043	-1.882	-1.899	0.170	0.162	0.000
33.0	7.75	0.00	1.74	-72.58	0.899	0.000	0.192	0.978	-1.593	-1.899	0.199	0.184	0.000
36.0	6.93	0.74	1.85	-70.88	0.728	0.892	0.182	0.747	-1.929	-1.899	0.229	0.201	0.000
39.0	4.93	1.07	1.88	-70.88	0.941	0.118	0.174	0.981	-1.944	-1.897	0.248	0.213	0.002
42.0	3.80	1.34	1.41	-81.83	0.438	0.148	0.194	3.481	-1.919	-1.894	0.267	0.228	0.003
45.0	2.77	1.19	1.90	-88.74	0.389	0.127	0.188	0.370	-1.900	-1.892	0.282	0.229	0.004
48.0	2.32	0.39	1.87	-73.17	0.298	0.108	0.118	0.302	-1.998	-1.899	0.299	0.228	0.005
51.0	3.87	9.92	0.84	-89.41	0.427	0.818	0.009	0.744	-1.914	-1.887	0.312	0.233	0.010
54.0	9.72	9.48	0.14	-98.85	0.831	1.048	0.018	1.221	-1.388	-1.782	0.342	0.247	0.028
57.0	7.03	12.98	0.98	-99.38	0.801	1.432	0.082	1.072	-1.899	-1.899	0.368	0.274	0.088
60.0	18.19	19.37	1.26	-82.72	1.114	1.498	0.132	2.833	-0.832	-1.398	0.444	0.329	0.142
63.0	18.11	18.43	1.89	-29.91	1.337	1.613	0.284	2.281	-0.998	-1.842	0.528	0.468	0.294
66.0	17.95	18.74	2.27	-18.33	1.499	1.867	0.298	2.389	-0.488	-0.721	0.829	0.918	0.482
69.0	14.37	18.43	2.78	-11.89	1.901	1.812	0.388	2.429	-0.242	-0.419	0.739	0.897	0.577
72.0	14.75	19.87	3.83	-6.97	1.827	1.791	0.334	2.414	-0.188	-0.137	0.898	0.814	0.771
75.0	14.82	14.42	3.38	4.84	1.947	1.613	0.372	2.288	0.181	0.181	0.879	0.874	0.888
78.0	8.03	8.08	8.08	-8.38	0.888	0.888	0.888	3.888	0.888	0.888	1.888	1.888	1.888

S45 L1

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.0456
 SECONDARY MASS FLOW = 0.1238
 M-TOTAL = 0.169
 AT TEST SECTION M-TOTAL = 0.169
 M-TOT(1/2 TEST SEC)/M-TOT(1/2 INLET) = 1.000

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS	0.0000	0.000
M-BACK AT WALL	0.0000	0.000
TOTAL M-BACK	0.0000	0.000

MOMENTUM FLUXES

	KG M/SEC	DIMENSIONLESS
ANGULAR MOMENTUM FLUX	0.130 N-M	1.020
AXIAL MOMENTUM FLUX	2.05 N	1.227
PRESSURE FORCE	0.841 N	0.503
THRUST	2.893 N	1.730
SWIRL NUMBER		0.832
SWIRL NUMBER (C.M.T. THRUST)		0.590

ENERGY FLUXES

	J/S	DIMENSIONLESS
AXIAL KINETIC ENERGY FLUX	12.49	1.649
TAN KINETIC ENERGY FLUX	19.08	1.988
TOTAL KINETIC ENERGY FLUX	27.58	3.633
PRESSURE ENERGY FLUX	-8.13	-0.888
TOTAL FLOW ENERGY FLUX	21.45	2.744

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
 VREF = 9.66 M/S BASED ON THROAT DIAMETER OF 0.0782 M
 REYNOLDS NO. = 6.931E 05

FURNACE TUNNEL

199.8 1.34 0.49 0.49 -11.87 0.093 0.013 0.012 0.096 -0.016 0.000 1.000 1.000 1.00

600H1

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.209
SECONDARY MASS FLOW = 0.599
M-TOTAL = 0.783
AT TEST SECTION M-TOTAL = 1.104
M-TOT(1/2 TEST SEC)/M-TOT(INLET) = 1.403

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS = 0.0008	0.0008	0.000
M-BACK AT WALL = 0.0009	0.0009	0.000
TOTAL M-BACK = 0.0009	0.0009	0.000

ANGULAR MOMENTUM FLUXES

	KG/M ² S	DIMENSIONLESS
ANGULAR MOMENTUM FLUX = 0.001 N-M	0.001	0.000
AXIAL ANGULAR FLUX = 19.18 N	19.18	0.007
PRESSURE FORCE = 0.977 N	0.977	0.024
THRUST = 20.199 N	20.199	0.722
SUHL NUMBER =		0.001
SUHL NUMBER (V.P.T. THRUST) =		0.001

ENERGY FLUXES

	J/S	DIMENSIONLESS
AXIAL KINETIC ENERGY FLUX = 100.94	100.94	0.370
TAN KINETIC ENERGY FLUX = 0.00	0.00	0.000
TOTAL KINETIC ENERGY FLUX = 100.94	100.94	0.370
PRESSURE ENERGY FLUX = -10.39	-10.39	-0.020
TOTAL FLOW ENERGY FLUX = 100.94	100.94	0.350

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
VREP = 30.00 M/S BASED ON THROAT DIAMETER OF 0.0702 M
REFNO. NO. = 0.1772 04

PROBE TYPE G

QUARTZ AIR TEMPERATURE 33.0 C

BAROMETRIC PRESSURE 757.3 TORR

R (MM)	U (IN/5)	V (IN/5)	W (IN/5)	PST-PU (PA)	U/VREF	V/VREF	W/VREF	WT/VREF	(PST-PU)/PREF EXPT	THEORY	STREAM	GR-FUNC	GT-FUNC
-75.0	3.78	0.00	-0.05	-1.02	0.413	0.000	-0.005	0.410	-0.040	-0.040			
-69.0	5.33	0.00	-0.25	0.77	0.487	0.000	-0.029	0.488	0.010	-0.040			
-29.0	7.27	0.00	-0.50	0.16	0.449	0.000	-0.058	0.492	0.004	-0.040			
0.0	8.59	0.00	0.00	-0.48	0.709	0.000	0.000	0.773	-0.012	-0.040	0.000	0.000	0.000
5.0	9.91	0.00	0.73	-1.01	0.700	0.000	0.045	0.784	-0.045	-0.040	0.003	0.005	0.000
10.0	9.92	0.00	0.00	-0.39	0.609	0.000	0.070	0.692	-0.009	-0.040	0.010	0.010	0.000
15.0	9.79	0.00	0.57	-0.20	0.876	0.000	0.087	0.879	-0.005	-0.040	0.022	0.030	0.000
20.0	9.45	0.00	0.01	0.47	0.837	0.000	0.071	0.841	0.011	-0.040	0.034	0.043	0.000
25.0	9.30	0.00	0.50	-2.11	0.828	0.000	0.095	0.832	-0.000	-0.040	0.050	0.094	0.000
30.0	4.90	0.00	0.51	1.30	0.902	0.000	0.000	0.909	0.020	-0.040	0.051	0.120	0.000
35.0	4.34	0.00	0.47	-0.00	0.977	0.000	0.095	0.980	-0.010	-0.040	0.107	0.109	0.000
40.0	4.34	0.00	0.41	0.02	0.942	0.000	0.040	0.944	0.010	-0.040	0.130	0.200	0.000
45.0	4.04	0.00	0.43	-0.45	0.942	0.000	0.050	0.944	-0.011	-0.040	0.109	0.240	0.000
50.0	4.00	0.00	0.40	-1.02	0.938	0.000	0.054	0.938	-0.043	-0.040	0.204	0.250	0.000
55.0	4.00	0.00	0.40	-3.34	0.925	0.000	0.057	0.928	-0.000	-0.040	0.243	0.340	0.000
60.0	4.22	0.00	0.41	-0.97	0.493	0.000	0.040	0.495	-0.023	-0.040	0.204	0.390	0.000
65.0	4.27	0.00	0.40	-1.01	0.400	0.000	0.093	0.901	-0.034	-0.040	0.327	0.440	0.000
70.0	3.63	0.00	0.40	0.32	0.424	0.000	0.090	0.427	0.000	-0.040	0.370	0.487	0.000
75.0	3.79	0.00	0.44	-1.22	0.437	0.000	0.092	0.440	-0.020	-0.040	0.414	0.543	0.000
80.0	3.02	0.00	0.59	-1.20	0.423	0.000	0.064	0.427	-0.031	-0.040	0.401	0.592	0.000
85.0	3.90	0.00	0.59	-0.27	0.400	0.000	0.080	0.414	-0.007	-0.040	0.500	0.640	0.000
90.0	3.20	0.00	0.40	-0.13	0.374	0.000	0.094	0.370	-0.003	-0.040	0.590	0.680	0.000
95.0	3.01	0.00	0.40	-1.01	0.391	0.000	0.047	0.394	-0.024	-0.040	0.603	0.727	0.000
100.0	3.44	0.00	0.92	-3.23	0.402	0.000	0.001	0.407	-0.077	-0.040	0.694	0.770	0.000
105.0	2.05	0.00	0.33	-2.74	0.309	0.000	0.030	0.311	-0.005	-0.040	0.709	0.820	0.000
110.0	2.31	0.00	0.37	-1.20	0.200	0.000	0.040	0.272	-0.030	-0.040	0.740	0.890	0.000
115.0	2.30	0.00	0.42	-1.52	0.200	0.000	0.040	0.273	-0.030	-0.040	0.700	0.970	0.000
120.0	2.11	0.00	0.30	-0.91	0.247	0.000	0.044	0.251	-0.012	-0.040	0.630	0.984	0.000
125.0	1.02	0.00	0.21	-1.30	0.212	0.000	0.024	0.214	-0.033	-0.040	0.672	0.927	0.000
130.0	1.70	0.00	0.59	-2.99	0.200	0.000	0.010	0.200	-0.024	-0.040	0.800	0.940	0.000
135.0	2.32	0.00	0.71	-2.39	0.271	0.000	0.024	0.272	-0.040	-0.040	0.993	0.970	0.000
140.0	1.00	0.00	-0.09	-0.17	0.217	0.000	-0.011	0.210	-0.000	0.000	1.000	1.000	0.000

2001

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.049
 SECONDARY MASS FLOW = 0.130
 M-TOTAL = 0.179
 AT TEST SECTION M-TOTAL = 0.221
 M-TOT(TEST SEC) / M-TOT(INLET) = 1.234

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS	0.0000	0.000
M-BACK AT WALL	0.0000	0.000
TOTAL M-BACK	0.0000	0.000

MOMENTUM FLUXES

	KG/S	DIMENSIONLESS
ANGULAR MOMENTUM FLUX	0.000 N-M	0.000
AXIAL MOMENTUM FLUX	0.77 N	0.909
PRESSURE FORCE	0.075 N	0.030
THRUST	0.049 N	0.384
SWIRL NUMBER		0.000
SWIRL NUMBER (G.R.T. THRUST)		0.000

ENERGY FLUXES

	J/S	DIMENSIONLESS
AXIAL KINETIC ENERGY FLUX	1.59	0.220
TAN KINETIC ENERGY FLUX	0.30	0.000
TOTAL KINETIC ENERGY FLUX	1.92	0.231
PRESSURE ENERGY FLUX	-0.23	-0.039
TOTAL FLOW ENERGY FLUX	1.29	0.190

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.06 PA
 VREF = 0.57 M/S BASED ON THROAT DIAMETER OF 0.0762 M
 REYNOLDS NO. = 0.0022 09

WARNING: A PITCH ANGLE OF 44.4 DEG. WAS CALCULATED AT $\dot{m} = 145.0$ HP. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF 74.0 DEG. WAS CALCULATED AT $\dot{m} = 150.0$ HP. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF 109.1 DEG. WAS CALCULATED AT $\dot{m} = 155.0$ HP. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF 133.8 DEG. WAS CALCULATED AT $\dot{m} = 160.0$ HP. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF 169.1 DEG. WAS CALCULATED AT $\dot{m} = 165.0$ HP. THIS POINT HAS BEEN ELIMINATED.

EXPERIMENT NO. 00341

PROBE SITE 0

QUAL AIR TEMPERATURE = 30.1 C

BAROMETRIC PRESSURE = 751.0 TORR

R (MM)	U (M/S)	W (M/S)	V (M/S)	PST-PW (PA)	U/VREF	W/VREF	V/VREF	VT/VREF	(PST-PW)/PREP EXPT THEORY	STREAM	SR-FUNC	ST-FUNC
70.0	12.00	1.38	-0.08	-37.22	0.391	0.009	-0.003	0.397	-0.040	-0.035		
75.0	17.20	2.28	-1.20	-26.30	0.480	0.002	-0.035	0.474	-0.032	-0.030		
80.0	20.00	1.93	-2.17	-20.30	0.560	0.002	-0.000	0.573	-0.037	-0.042		
85.0	24.03	0.43	3.01	-23.10	0.671	0.012	0.002	0.670	-0.030	-0.044	0.000	0.000
90.0	25.14	0.44	3.20	-22.44	0.685	0.012	0.007	0.680	-0.030	-0.044	0.002	0.003
100.0	29.39	0.00	3.30	-20.23	0.690	0.000	0.001	0.702	-0.037	-0.044	0.000	0.012
110.0	29.34	0.22	3.30	-20.23	0.690	0.000	0.002	0.702	-0.034	-0.044	0.020	0.020
120.0	29.04	0.22	3.42	-20.50	0.690	0.000	0.003	0.704	-0.030	-0.044	0.030	0.000
130.0	29.42	0.27	3.50	-20.40	0.692	0.007	0.000	0.690	-0.030	-0.044	0.000	0.000
140.0	29.27	0.30	3.92	-20.10	0.690	0.010	0.000	0.692	-0.037	-0.044	0.000	0.113
150.0	24.77	0.40	3.40	-32.70	0.670	0.013	0.000	0.681	-0.040	-0.044	0.100	0.102
160.0	24.41	0.91	3.40	-29.00	0.680	0.014	0.003	0.671	-0.030	-0.044	0.140	0.100
170.0	23.00	0.83	3.31	-20.20	0.690	0.023	0.000	0.690	-0.037	-0.044	0.170	0.014
180.0	23.00	0.64	3.21	-22.94	0.627	0.023	0.007	0.634	-0.030	-0.043	0.210	0.023
190.0	22.07	1.20	3.10	-23.00	0.610	0.034	0.004	0.621	-0.031	-0.043	0.207	0.037
200.0	22.00	1.91	2.97	-24.02	0.602	0.041	0.001	0.600	-0.032	-0.043	0.302	0.402
210.0	21.73	1.70	3.00	-20.30	0.591	0.040	0.003	0.590	-0.030	-0.043	0.340	0.400
220.0	21.04	2.03	3.03	-21.37	0.574	0.000	0.002	0.582	-0.020	-0.042	0.400	0.120
230.0	20.43	2.14	3.10	-20.77	0.550	0.000	0.000	0.560	-0.030	-0.042	0.492	0.100
240.0	19.70	2.43	3.10	-41.20	0.530	0.000	0.000	0.530	-0.004	-0.041	0.307	0.040
250.0	10.01	2.50	3.30	-29.30	0.507	0.000	0.001	0.510	-0.030	-0.041	0.507	0.203
260.0	17.42	2.00	3.30	-30.00	0.470	0.071	0.002	0.480	-0.041	-0.040	0.617	0.704
270.0	10.10	2.01	3.30	-40.00	0.440	0.070	0.002	0.447	-0.000	-0.040	0.071	0.000
280.0	19.07	2.70	3.50	-30.57	0.410	0.070	0.000	0.420	-0.001	-0.030	0.720	0.000
290.0	13.13	2.70	3.00	-31.57	0.350	0.070	0.000	0.370	-0.041	-0.030	0.770	0.000
300.0	11.70	3.71	3.30	-41.10	0.310	0.070	0.002	0.340	-0.070	-0.030	0.021	0.000
310.0	10.22	3.00	3.20	-41.00	0.270	0.002	0.000	0.300	-0.000	-0.037	0.000	0.700

20541

	J/S	DIMENSIONLESS
AREAL KINETIC ENERGY FLUX =	115.00	0.300
TAN KINETIC ENERGY FLUX =	2.30	0.005
TOTAL KINETIC ENERGY FLUX =	117.30	0.305
PRESSURE ENERGY FLUX =	-17.00	-0.055
TOTAL FLOW ENERGY FLUX =	100.30	0.325

EXPERIMENT NO. 085L1

PROBE SIZE 0
 QUART AIR TEMPERATURE = 39.7 C
 BAROMETRIC PRESSURE = 797.3 TORR

N (MM)	U (M/S)	V (M/S)	W (M/S)	PST-PU (PA)	U/VREF	V/VREF	W/VREF	WT/VREF	(PST-PU)/PREF EXPT THEORY	STREAP	GR-FUNC	GT-FUNC
-75.0	3.84	0.93	0.01	-1.67	0.484	0.199	0.001	0.477	-0.038 0.018			
-93.0	5.87	0.77	-0.23	-0.44	0.891	0.891	-0.827	0.899	-0.299 0.009			
-15.0	0.71	0.89	-0.49	0.10	0.790	0.878	-0.893	0.789	0.004 -0.002			
0.0	0.90	0.93	0.49	-0.79	0.779	0.879	0.899	0.789	-0.010 -0.009	0.008	0.009	0.009
5.0	0.47	0.49	0.72	-0.44	0.741	0.853	0.889	0.768	-0.010 -0.009	0.003	0.009	0.009
10.0	0.13	0.43	0.77	-0.29	0.722	0.890	0.890	0.729	-0.004 -0.001	0.011	0.017	0.002
15.0	0.04	0.44	0.83	-0.33	0.710	0.892	0.899	0.710	-0.009 0.001	0.023	0.037	0.006
20.0	0.02	0.44	0.77	0.89	0.642	0.892	0.891	0.670	0.017 0.003	0.046	0.083	0.013
25.0	0.48	0.43	0.72	0.88	0.649	0.891	0.894	0.692	0.021 0.004	0.061	0.093	0.029
30.0	0.17	0.46	0.90	1.48	0.608	0.899	0.899	0.614	0.038 0.009	0.088	0.127	0.042
35.0	4.83	0.49	0.36	2.13	0.900	0.893	0.842	0.904	0.093 0.008	0.114	0.183	0.089
40.0	4.72	0.37	0.37	1.72	0.999	0.844	0.843	3.999	0.042 0.008	0.144	0.281	0.091
45.0	4.72	0.33	0.28	0.89	0.998	0.839	0.831	0.998	0.023 0.007	0.170	0.242	0.119
50.0	4.83	0.31	0.29	1.42	0.949	0.838	0.834	0.948	0.039 0.007	0.219	0.297	0.190
55.0	4.40	0.31	0.22	1.29	0.910	0.836	0.826	0.920	0.032 0.007	0.299	0.334	0.186
60.0	4.39	0.27	0.27	0.94	0.912	0.832	0.832	0.914	0.014 0.008	0.297	0.382	0.229
65.0	4.41	0.04	0.28	1.28	0.919	0.829	0.831	0.928	0.032 0.008	0.343	0.434	0.249
70.0	4.26	0.04	0.28	1.28	0.902	0.824	0.831	0.903	0.029 0.008	0.393	0.489	0.298
75.0	4.26	0.04	0.40	1.44	0.901	0.804	0.847	0.903	0.039 0.008	0.449	0.547	0.284
80.0	4.23	0.04	0.44	0.22	0.400	0.804	0.851	0.901	0.009 0.008	0.900	0.897	0.272
85.0	4.11	0.07	0.33	-0.98	0.404	0.808	0.838	0.409	-0.012 0.008	0.950	0.870	0.287
90.0	3.88	0.07	0.40	-0.83	0.457	0.803	0.859	3.461	-0.016 0.008	0.017	0.731	0.307
95.0	3.99	0.08	0.41	-0.93	0.410	0.807	0.846	0.421	-0.013 0.008	0.879	0.788	0.320
100.0	3.40	0.08	0.39	-0.19	0.400	0.807	0.841	0.403	-0.009 0.008	0.732	0.830	0.349
105.0	2.88	0.29	0.40	-0.00	0.339	0.830	0.847	0.344	-0.000 0.008	0.786	0.882	0.382
110.0	2.90	0.23	0.39	0.43	0.306	0.827	0.839	0.387	0.011 0.008	0.839	0.917	0.462
115.0	2.84	0.27	0.29	0.02	0.299	0.831	0.834	0.382	0.000 0.008	0.884	0.949	0.517
120.0	2.09	0.47	0.19	0.42	0.241	0.898	0.822	0.240	0.010 0.008	0.920	0.976	0.604
125.0	1.04	0.99	-0.10	0.88	0.123	0.889	-0.811	0.141	0.010 0.008	0.981	0.980	0.799
130.0	1.87	0.91	-0.21	0.38	0.120	0.107	-0.829	0.107	0.009 0.008	0.993	0.991	0.877
135.0	0.44	1.22	-0.29	0.13	0.992	0.144	-0.836	0.197	0.003 0.008	1.000	1.000	1.000

MASS FLOWRATES IN KG/S

Q05L1

PRIMARY MASS FLOW = 0.046
 SECONDARY MASS FLOW = 0.120
 M-TOTAL = 0.176
 AT TEST SECTION M-TOTAL = 0.210
 M-TOT(1) TEST SEC(1)/M-TOT(INLET) = 1.204

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS = 0.0000	0.000	
M-BACK AT WALL = 0.0000	0.000	
TOTAL M-BACK = 0.0000	0.000	

MOMENTUM FLUXES

	KG/S	DIMENSIONLESS
ANGULAR MOMENTUM FLUX = 0.004 N-M	0.033	
AXIAL MOMENTUM FLUX = 0.01 N	0.040	
PRESSURE FORCE = -0.025 N	0.000	
THRUST = 0.787 N	0.031	
SWIRL NUMBER =	0.061	
SWIRL NUMBER (D.R.T. THRUST) =	0.083	

ENERGY FLUXES

	J/S	DIMENSIONLESS
AXIAL KINETIC ENERGY FLUX = 1.70	0.170	
TAN KINETIC ENERGY FLUX = 0.01	0.002	
TOTAL KINETIC ENERGY FLUX = 1.73	0.175	
PRESSURE ENERGY FLUX = 0.10	0.015	
TOTAL FLOW ENERGY FLUX = 1.83	0.190	

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
 VREF = 0.90 M/S BASED ON THROAT DIAMETER OF 0.0762 M
 REYNOLDS NO. = 0.175E 05

MODE SITE 0

DUAL AIR TEMPERATURE = 39.4 C

BAROMETRIC PRESSURE = 752.2 TORR

Q (MW)	U (M/S)	V (M/S)	W (M/S)	PST-PA (PA)	U/VREF	V/VREF	W/VREF	VT/VREF	IPST-PA/PREF EXPT THEORY	STREAM	SE-FUNC	ST-FUNC
75.0	9.03	3.59	-0.47	-39.78	0.192	0.007	-0.013	0.181	-0.002	-0.007		
80.0	9.07	3.72	-2.41	-48.35	0.202	0.100	-0.005	0.234	-0.002	-0.005		
85.0	9.09	3.24	-0.49	-59.28	0.243	0.007	-0.120	0.284	-0.077	-0.078		
9.0	9.03	2.20	9.87	-55.88	0.244	0.001	0.190	0.297	-0.073	-0.003	0.000	0.000
9.0	9.45	2.10	8.14	-55.33	0.255	0.003	0.160	0.310	-0.073	-0.002	0.001	0.000
10.0	9.55	2.03	8.21	-56.05	0.289	0.005	0.160	0.321	-0.076	-0.077	0.002	0.002
15.0	10.14	1.18	8.04	-51.84	0.274	0.031	0.105	0.322	-0.008	-0.075	0.000	0.000
20.0	10.50	1.25	8.01	-61.82	0.198	0.034	0.104	0.350	-0.000	-0.074	0.010	0.000
25.0	10.90	0.88	7.14	-53.67	0.190	0.023	0.102	0.354	-0.070	-0.074	0.017	0.001
30.0	11.00	0.37	7.25	-58.31	0.310	0.010	0.190	0.372	-0.070	-0.074	0.025	0.001
35.0	12.20	0.17	7.02	-60.00	0.331	0.000	0.200	0.380	-0.070	-0.074	0.035	0.001
40.0	12.03	0.90	8.47	-57.20	0.340	0.015	0.220	0.410	-0.074	-0.074	0.047	0.001
45.0	13.40	0.50	8.19	-65.20	0.384	0.010	0.220	0.420	-0.005	-0.074	0.001	0.000
50.0	14.10	0.74	8.37	-66.90	0.382	0.020	0.220	0.444	-0.000	-0.074	0.070	0.003
55.0	14.00	0.03	8.92	-69.40	0.380	0.025	0.241	0.450	-0.005	-0.074	0.007	0.000
60.0	14.10	0.90	8.25	-58.10	0.383	0.027	0.230	0.450	-0.077	-0.074	0.110	0.000
65.0	14.41	1.30	9.07	-60.00	0.380	0.037	0.250	0.467	-0.070	-0.073	0.141	0.000
70.0	14.47	1.07	9.53	-59.15	0.391	0.040	0.297	0.470	-0.005	-0.073	0.100	0.013
75.0	14.94	1.04	9.00	-64.13	0.383	0.050	0.287	0.477	-0.003	-0.073	0.193	0.010
80.0	14.33	2.01	10.10	-59.70	0.387	0.054	0.173	0.470	-0.070	-0.072	0.221	0.020
85.0	14.02	2.35	10.17	-61.23	0.370	0.003	0.270	0.472	-0.000	-0.072	0.251	0.034
90.0	13.04	2.70	10.40	-57.93	0.370	0.075	0.283	0.471	-0.075	-0.071	0.202	0.040
95.0	13.07	3.40	10.50	-63.30	0.360	0.003	0.280	0.470	-0.002	-0.071	0.314	0.000
100.0	14.07	4.03	10.30	-77.10	0.380	0.100	0.280	0.484	-0.100	-0.070	0.340	0.001
105.0	13.09	3.70	10.87	-51.77	0.353	0.102	0.290	0.472	-0.007	-0.000	0.300	0.104
110.0	12.70	3.90	10.70	-66.07	0.304	0.107	0.290	0.483	-0.000	-0.000	0.420	0.120
115.0	12.74	4.20	10.72	-68.04	0.304	0.115	0.200	0.480	-0.001	-0.000	0.457	0.150
120.0	12.70	9.02	10.40	-59.00	0.304	0.130	0.203	0.480	-0.077	-0.005	0.405	0.100
125.0	12.43	9.33	10.53	-51.00	0.330	0.104	0.204	0.483	-0.070	-0.004	0.535	0.000
130.0	12.30	9.37	10.71	-62.30	0.334	0.105	0.200	0.480	-0.005	-0.002	0.570	0.274
135.0	12.21	9.67	10.00	-65.01	0.330	0.190	0.200	0.480	-0.000	-0.000	0.617	0.324
140.0	11.01	8.41	10.30	-47.07	0.322	0.170	0.200	0.480	-0.002	-0.000	0.600	0.301
145.0	11.37	8.40	10.30	-39.01	0.307	0.174	0.200	0.480	-0.002	-0.000	0.702	0.404
150.0	11.20	8.40	10.10	-36.67	0.303	0.170	0.201	0.480	-0.000	-0.000	0.700	0.400
155.0	11.10	8.00	10.14	-61.70	0.301	0.100	0.274	0.480	-0.000	-0.000	0.700	0.402
160.0	10.00	7.13	8.00	-37.30	0.240	0.100	0.200	0.480	-0.000	-0.000	0.630	0.400

165.0	10.13	7.47	0.51	-39.42	0.474	0.202	0.257	0.428	-0.047	-0.047	0.075	0.004	0.763
170.0	9.06	7.41	0.14	-30.41	0.400	0.200	0.247	0.400	-0.040	-0.040	0.017	0.030	0.027
175.0	8.24	7.40	0.50	-32.82	0.249	0.200	0.232	0.399	-0.042	-0.042	0.050	0.070	0.013
180.0	8.04	7.47	0.30	-31.11	0.230	0.202	0.220	0.380	-0.042	0.000	1.000	1.000	1.000

Q10HA

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.200
 SECONDARY MASS FLOW = 0.993
 M-TOTAL = 0.790
 AT TEST SECTION M-TOTAL = 1.370
 M-TOT(1/2 TEST SECT)/M-TOT(1/2 INLET) = 1.010

RECIRCULATION

M-BACK ON AXIS = 0.0000 KG/S DIMENSIONLESS 0.000
 M-BACK AT WALL = 0.0000 0.000
 TOTAL M-BACK = 0.0000 0.000

MOMENTUM FLUXES

ANGULAR MOMENTUM FLUX = 0.000 N-M DIMENSIONLESS 0.400
 AXIAL MOMENTUM FLUX = 10.00 N 0.002
 PRESSURE FORCE = 4.040 N 0.307
 THRUST = 21.040 N 0.770
 SWIRL NUMBER = 0.004
 SWIRL NUMBER (V.R.T. THRUST) = 0.013

ENERGY FLUXES

AREAL KINETIC ENERGY FLUX = 100.54 J/S DIMENSIONLESS 0.203
 TAN KINETIC ENERGY FLUX = 17.00 0.033
 TOTAL KINETIC ENERGY FLUX = 101.32 0.300
 PRESSURE ENERGY FLUX = -01.45 -0.110
 TOTAL FLOW ENERGY FLUX = 120.87 0.250

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
 VREF = 37.04 M/S BASED ON THROAT DIAMETER OF 0.0702 M
 REYNOLDS NO. = 0.301E 00

WARNING: A PITCH ANGLE OF -41.2 DEG. WAS CALCULATED AT R = -30.0 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF -100.5 DEG. WAS CALCULATED AT R = -25.0 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF -43.5 DEG. WAS CALCULATED ON THE AXIS. ITS DATA HAS BEEN ALTERED FOR INTEGRATION.

WARNING: A PITCH ANGLE OF 46.1 DEG. WAS CALCULATED AT R = 110.0 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF 42.0 DEG. WAS CALCULATED AT R = 115.0 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF 1307.3 DEG. WAS CALCULATED AT R = 120.0 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF 1379.2 DEG. WAS CALCULATED AT R = 125.0 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF 1598.9 DEG. WAS CALCULATED AT R = 130.0 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF 63.5 DEG. WAS CALCULATED AT R = 135.0 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF 49.0 DEG. WAS CALCULATED AT R = 140.0 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF 46.7 DEG. WAS CALCULATED AT R = 155.0 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF 55.8 DEG. WAS CALCULATED AT R = 200.0 MM. THIS POINT HAS BEEN ELIMINATED.

EXPERIMENT NO. 020M1

PROBE SIZE 0

STAND AIR TEMPERATURE = 41.2 C

BAROMETRIC PRESSURE = 752.1 TORR

R (MM)	U (M/S)	V (M/S)	W (M/S)	PT-PA (PA)	U/VREF	V/VREF	W/VREF	WT/VREF	(PT-PA)/PREF EXPT THEORY	STREP	OX-FUNC	OT-FUNC
-70.0	-0.02	2.08	1.93	-114.18	-0.123	0.039	0.041	0.141	-0.148	-0.001		
0.0	0.20	0.00	0.00	-119.24	0.113	0.000	0.000	0.113	-0.147	-0.014	0.000	0.000
9.0	0.20	0.24	-3.19	-119.24	0.113	0.000	-0.044	0.141	-0.147	-0.003	0.000	0.000
10.0	0.02	0.00	-2.90	-116.91	0.123	0.002	-0.079	0.140	-0.147	-0.003	0.002	0.001
19.0	0.02	0.13	-2.74	-118.13	0.131	0.003	-0.073	0.150	-0.148	-0.003	0.004	0.002
20.0	9.13	0.39	-2.49	-114.09	0.137	0.009	-0.089	0.152	-0.147	-0.003	0.009	0.003
20.0	9.31	0.69	-2.30	-113.70	0.144	0.001	-0.081	0.156	-0.149	-0.003	0.013	0.009
30.0	9.90	0.19	-1.70	-110.93	0.159	0.009	-0.047	0.160	-0.152	-0.003	0.019	0.009
39.0	0.12	0.09	-1.34	-119.70	0.163	0.002	-0.036	0.167	-0.148	-0.003	0.027	0.012
49.0	0.92	0.20	-0.94	-110.10	0.174	0.007	-0.029	0.170	-0.151	-0.003	0.037	0.010
49.0	0.49	0.11	-0.91	-110.27	0.172	0.003	-0.014	0.172	-0.148	-0.003	0.046	0.022
58.0	0.10	0.25	-0.17	-119.21	0.184	0.007	-0.010	0.184	-0.149	-0.003	0.061	0.020
59.0	0.10	0.27	-0.13	-111.70	0.189	0.007	-0.003	0.189	-0.143	-0.003	0.074	0.034
68.0	0.23	0.44	9.39	-119.99	0.180	0.012	0.009	0.187	-0.144	-0.003	0.089	0.041
69.0	9.41	0.19	3.09	-110.40	0.150	0.009	0.017	0.191	-0.141	-0.003	0.134	0.040
70.0	0.01	0.10	0.04	-109.91	0.120	0.009	0.029	0.152	-0.139	-0.003	0.110	0.044

75.0	0.10	3.20	1.40	-107.11	0.137	0.009	0.037	0.142	-0.137	-0.003	0.133	0.000	0.002
80.0	0.03	3.40	1.30	-102.99	0.123	0.011	0.039	0.120	-0.122	-0.003	0.140	0.000	0.002
85.0	0.03	0.00	3.00	-110.94	0.000	0.000	0.000	0.000	-0.141	-0.003	0.138	0.000	0.003
90.0	-1.13	1.31	1.14	-102.41	-0.020	0.034	0.030	0.099	-0.131	-0.003	0.134	0.000	0.002
95.0	-1.31	1.91	1.30	-102.39	-0.039	0.040	0.037	0.000	-0.131	-0.003	0.130	0.000	0.002
100.0	-2.25	1.00	1.40	-98.70	-0.000	0.050	0.040	0.000	-0.128	-0.003	0.142	0.070	0.000
105.0	-2.30	1.00	1.00	-95.50	-0.001	0.091	0.050	0.000	-0.122	-0.003	0.133	0.072	-0.002
105.0	0.20	2.05	2.72	-94.42	0.114	0.070	0.073	0.199	-0.121	-0.000	0.109	0.112	0.030
110.0	0.47	3.37	3.00	-87.42	0.172	0.000	0.002	0.211	-0.124	-0.000	0.220	0.127	0.090
115.0	0.97	3.01	3.00	-83.49	0.230	0.102	0.090	0.200	-0.110	-0.050	0.279	0.199	0.007
100.0	10.00	0.31	0.30	-82.40	0.292	0.110	0.110	0.330	-0.110	-0.050	0.330	0.203	0.139
105.0	13.25	9.03	9.73	-80.10	0.353	0.134	0.193	0.407	-0.110	-0.057	0.410	0.279	0.200
170.0	15.40	9.05	0.99	-73.31	0.410	0.190	0.179	0.473	-0.000	-0.050	0.910	0.309	0.314
175.0	17.03	0.04	7.04	-63.33	0.454	0.177	0.204	0.920	-0.001	-0.054	0.033	0.033	0.400
100.0	17.72	7.49	0.30	-53.74	0.472	0.190	0.223	0.950	-0.000	-0.052	0.700	0.703	0.047
105.0	10.93	7.02	0.00	-39.41	0.440	0.107	0.237	0.934	-0.050	-0.050	0.000	0.072	0.000
100.0	12.01	9.30	10.32	3.03	0.330	0.143	0.279	0.497	0.000	0.000	1.000	1.000	1.000

Q 20 HA

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.209
SECONDARY MASS FLOW = 0.599
M-TOTAL = 0.708
AT TEST SECTION M-TOTAL = 0.000
M-TOT/TEST SECT/M-TOT/INLET = 1.117

RECIRCULATION

M-SACK ON AXIS = 0.0537 0.003
M-SACK AT WALL = 0.3900 0.000
TOTAL M-SACK = 0.0537 0.003

MOMENTUM FLUXES

ANGULAR MOMENTUM FLUX = 0.725 N-M 0.333
AXIAL MOMENTUM FLUX = 11.03 N 0.300
PRESSURE FORCE = 10.017 N 0.314
THRUST = 21.043 N 0.737
SWIRL NUMBER = 0.002
SWIRL NUMBER (G.R.T. THRUST) = 0.492

ENERGY FLUXES

AXIAL KINETIC ENERGY FLUX = 77.01 0.140
TAN KINETIC ENERGY FLUX = 12.99 0.023
TOTAL KINETIC ENERGY FLUX = 107.99 0.201
PRESSURE ENERGY FLUX = -99.01 -0.100
TOTAL FLOW ENERGY FLUX = 91.70 0.097

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
WCF = 37.43 P/L ALSED IN THROAT DIAPHRAGM OF 0.0702 M
REYNOLDS NO. = 0.1000 0.0

WARNING: A PITCH ANGLE OF 128.3 DEG. WAS CALCULATED AT R = 139.8 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF 84.1 DEG. WAS CALCULATED AT R = 199.0 MM. THIS POINT HAS BEEN ELIMINATED.

EXPERIMENT NO. 628C1

PROBE SITE 0

QUARTZ AIR TEMPERATURE = 34.1 C

BAROMETRIC PRESSURE = 752.2 TORR

R (MM)	U (M/S)	W (M/S)	V (M/S)	PST-PP (PA)	U/VREF	U/VREF	U/VREF	VT/VREF	(PST-PP)/PREP EXPT THEORY	STREAP	OX-FUNC	ST-FUNC
0.0	0.00	0.00	0.00	-0.00	0.000	0.000	0.000	0.000	0.000 -0.000	0.000	0.000	0.000
120.0	0.85	0.85	0.39	-4.64	0.000	0.104	0.040	0.119	-0.122 -0.000	0.015	0.000	0.000
140.0	0.90	0.32	0.70	-4.90	0.110	0.030	0.000	0.140	-0.120 -0.000	0.000	0.015	0.020
145.0	1.10	0.45	0.80	-4.43	0.142	0.050	0.000	0.174	-0.117 -0.000	0.000	0.020	0.020
150.0	1.00	0.90	0.70	-5.30	0.200	0.071	0.000	0.234	-0.141 -0.000	0.140	0.040	0.040
155.0	1.00	0.01	0.00	-5.12	0.232	0.100	0.100	0.170	-0.130 -0.000	0.100	0.070	0.070
160.0	2.00	0.00	0.00	-5.00	0.324	0.110	0.110	0.302	-0.130 -0.000	0.200	0.130	0.120
165.0	3.00	1.00	1.00	-3.04	0.370	0.130	0.130	0.420	-0.101 -0.000	0.300	0.220	0.200
170.0	5.70	1.40	1.00	-4.01	0.400	0.170	0.100	0.510	-0.100 -0.000	0.470	0.300	0.300
175.0	3.00	1.31	1.00	-3.70	0.470	0.140	0.100	0.530	-0.100 -0.000	0.500	0.520	0.400
180.0	3.00	1.40	1.70	0.00	0.400	0.170	0.210	0.501	0.000 -0.000	0.740	0.710	0.600
185.0	3.00	1.00	1.00	-1.77	0.400	0.100	0.220	0.520	-0.040 -0.000	0.800	0.800	0.800
190.0	2.40	1.10	1.00	0.20	0.200	0.140	0.230	0.401	0.000 0.000	1.000	1.000	1.000

Q201

MASS FLOWRATES IN KG/S

PRIMARY PASS FLOW = 0.048
SECONDARY MASS FLOW = 0.124
M-TOTAL = 0.169
AT TEST SECTION M-TOTAL = 0.178
M-TOT(1/TEST SEC)/M-TOT(INLET) = 1.351

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS = 0.0300	0.0300	0.000
M-BACK AT WALL = 0.0300	0.0300	0.000
TOTAL M-BACK = 0.0300	0.0300	0.000

MOMENTUM FLUXES

		DIMENSIONLESS
ANGULAR MOMENTUM FLUX = 0.039 N-m	0.039	0.333
AXIAL MOMENTUM FLUX = 0.94 N	0.94	0.388
PRESSURE FORCE = 0.461 N	0.461	0.318
THRUST = 0.999 N	0.999	0.722
SWIRL NUMBER =		0.459
SWIRL NUMBER (W.R.T. THRUST) =		0.461

ENERGY FLUXES

	J/S	DIMENSIONLESS
AXIAL KINETIC ENERGY FLUX = 0.91	0.91	0.101
TAN KINETIC ENERGY FLUX = 0.13	0.13	0.023
TOTAL KINETIC ENERGY FLUX = 1.21	1.21	0.214
PRESSURE ENERGY FLUX = -0.99	-0.99	-0.008
TOTAL FLOW ENERGY FLUX = 0.71	0.71	0.126

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
VREF = 0.10 M/S BASED ON THROAT DIAMETER OF 0.0762 M
REYNOLDS NO. = 0.041E 03

WARNING: A PITCH ANGLE OF -71.0 DEG. WAS CALCULATED AT R = -29.0 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF -71.0 DEG. WAS CALCULATED AT R = -29.0 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF 41.3 DEG. WAS CALCULATED AT R = 120.0 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF 91.9 DEG. WAS CALCULATED AT R = 199.0 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF 114.1 DEG. WAS CALCULATED AT R = 199.7 MM. THIS POINT HAS BEEN ELIMINATED.

EXPERIMENT NO. 030H1

PROBE SIZE 0

QUARTZ AIR TEMPERATURE = 39.3 C

BAROMETRIC PRESSURE = 752.6 TORR

R (MM)	U (M/S)	W (M/S)	V (M/S)	PST-PU (PA)	U/VREF	V/VREF	W/VREF	VT/VREF	IPST-PU/PPEP EXPT THEORY	STREAM	OX-FUNC	OT-FUNC
-75.0	-0.41	3.70	2.02	-149.05	-0.119	0.100	0.094	0.104	-0.103	-0.123		
0.0	-2.70	1.12	-1.59	-159.10	-0.074	0.030	-0.043	0.091	-0.207	-0.133	0.000	0.000
5.0	-2.07	1.00	-1.94	-156.19	-0.072	0.027	-0.041	0.087	-0.203	-0.133	-0.000	-0.000
10.0	-3.57	0.98	-0.70	-161.05	-0.080	0.020	-0.021	0.102	-0.210	-0.131	-0.002	-0.000
15.0	-4.15	0.92	-0.40	-162.01	-0.112	0.029	-0.011	0.119	-0.210	-0.131	-0.004	-0.000
20.0	-4.10	0.37	0.02	-161.59	-0.113	0.010	0.001	0.113	-0.210	-0.131	-0.000	-0.000
25.0	-4.03	0.20	0.91	-161.30	-0.124	0.009	0.014	0.129	-0.209	-0.131	-0.013	-0.000
30.0	-4.44	0.22	0.00	-159.30	-0.120	0.000	0.022	0.123	-0.207	-0.131	-0.010	-0.000
35.0	-4.71	0.62	1.07	-159.00	-0.127	0.017	0.029	0.131	-0.207	-0.131	-0.020	-0.000
40.0	-5.20	1.24	1.23	-157.07	-0.140	0.034	0.033	0.140	-0.205	-0.130	-0.030	-0.000
45.0	-5.20	1.07	1.92	-157.17	-0.140	0.040	0.041	0.193	-0.204	-0.130	-0.047	-0.001
50.0	-5.32	2.07	1.92	-150.72	-0.140	0.050	0.041	0.104	-0.200	-0.130	-0.050	-0.002
55.0	-5.02	2.04	1.59	-159.37	-0.191	0.071	0.042	0.172	-0.202	-0.129	-0.074	-0.003
60.0	-5.06	3.09	1.77	-154.90	-0.192	0.002	0.040	0.170	-0.201	-0.120	-0.090	-0.004
65.0	-5.70	3.40	1.00	-159.29	-0.199	0.003	0.050	0.107	-0.199	-0.120	-0.100	-0.007
70.0	-5.70	3.07	1.94	-153.03	-0.194	0.100	0.092	0.104	-0.199	-0.129	-0.127	-0.010
75.0	-5.93	4.21	2.00	-154.09	-0.199	0.113	0.099	0.203	-0.201	-0.123	-0.140	-0.013
80.0	-5.01	4.71	2.00	-159.03	-0.191	0.127	0.099	0.209	-0.202	-0.122	-0.171	-0.010
85.0	-5.90	4.95	2.10	-140.07	-0.140	0.133	0.099	0.200	-0.193	-0.120	-0.190	-0.024
90.0	-5.47	9.20	2.19	-159.03	-0.147	0.140	0.090	0.211	-0.199	-0.117	-0.210	-0.031
95.0	-4.95	5.40	2.14	-152.03	-0.133	0.149	0.090	0.209	-0.197	-0.115	-0.242	-0.030
100.0	-4.46	9.91	2.23	-159.10	-0.120	0.140	0.080	0.200	-0.190	-0.113	-0.200	-0.040
105.0	-3.70	9.30	2.00	-140.00	-0.102	0.104	0.072	0.101	-0.194	-0.111	-0.200	-0.093
110.0	-2.01	9.02	2.07	-150.03	-0.070	0.139	0.000	0.100	-0.199	-0.109	-0.203	-0.090
115.0	-1.01	4.01	2.00	-152.10	-0.044	0.124	0.000	0.140	-0.197	-0.100	-0.310	-0.003
120.0	0.20	3.02	2.43	-159.07	0.007	0.001	0.000	0.109	-0.202	-0.100	-0.320	-0.000
125.0	1.49	1.94	1.00	-140.90	0.030	0.100	0.190	0.124	-0.114	-0.100	-0.317	-0.000

139.0	3.31	4.82	2.18	-167.98	0.081	0.130	0.098	0.100	-0.210	-0.184	-0.381	0.073	-0.058
143.0	0.22	0.22	2.38	-170.34	0.188	0.188	0.094	0.248	-0.228	-0.182	-0.288	0.081	-0.041
149.0	0.93	0.47	3.34	-169.22	0.238	0.174	0.098	0.382	-0.228	-0.188	-0.719	0.099	-0.011
150.0	11.19	7.33	3.88	-179.71	0.382	0.197	0.107	0.378	-0.228	-0.098	-0.142	0.131	0.039
159.0	13.78	7.79	4.82	-171.82	0.371	0.210	0.138	0.448	-0.222	-0.099	-0.067	0.184	0.184
169.0	19.88	7.98	5.89	-158.48	0.427	0.284	0.192	0.497	-0.288	-0.092	0.078	0.281	0.192
189.0	10.60	7.83	8.41	-167.55	0.489	0.211	0.173	0.998	-0.191	-0.098	0.298	0.389	0.299
179.0	19.23	8.39	7.19	-129.47	0.917	0.229	0.193	0.998	-0.184	-0.097	0.384	0.484	0.431
179.0	19.87	8.83	7.78	-188.78	0.938	0.233	0.289	0.819	-0.182	-0.094	0.932	0.838	0.984
189.0	18.89	8.37	8.27	-77.88	0.988	0.229	0.223	0.997	-0.181	-0.081	0.783	0.783	0.744
189.0	18.92	7.89	8.59	-88.48	0.458	0.213	0.231	0.984	-0.078	-0.078	0.888	0.812	0.899
198.0	11.74	9.28	8.44	-22.92	0.318	0.148	0.227	0.414	-0.028	0.088	1.088	1.088	1.088

63041

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.399
 SECONDARY MASS FLOW = 0.592
 M-TOTAL = 0.997
 AT TEST SECTION M-TOTAL = 0.782
 M-TOT(1/2 TEST SEC)/M-TOT(INLET) = 0.927

RECIRCULATION

KG/S DIMENSIONLESS
 M-BACK ON AXIS = 0.2178 0.224
 M-BACK AT JAIL = 0.0300 0.030
 TOTAL M-BACK = 0.2278 0.224

MOMENTUM FLUXES

ANGULAR MOMENTUM FLUX = 1.129 N-M DIMENSIONLESS 0.927
 AXIAL MOMENTUM FLUX = 19.87 N 0.984
 PRESSURE FORCE = 18.192 N 0.828
 THRUST = 32.828 N 1.138
 SWIRL NUMBER = 0.834
 SWIRL NUMBER (V.R.T. THRUST) = 0.483

ENERGY FLUXES

J/S DIMENSIONLESS
 AXIAL KINETIC ENERGY FLUX = 122.29 0.234
 TAN KINETIC ENERGY FLUX = 29.99 0.058
 TOTAL KINETIC ENERGY FLUX = 189.19 0.324
 PRESSURE ENERGY FLUX = -78.83 -0.138
 TOTAL PLCV ENERGY FLUX = 99.27 0.188

MISCELLANEOUS DATA

PRESSURE AT JAIL = 0.88 PA
 VSEP = 37.13 M/S BASED ON THROAT DIAMETER OF 0.0782 M
 REYNOLDS NO. = 0.3827 88

EXPERIMENT NO. 03011

PHONE SITE 0

QUARTZ AIR TEMPERATURE = 30.0 C

BAROMETRIC PRESSURE = 717.3 TORR

Q (MM)	U (M/S)	V (M/S)	W (M/S)	PST-P0 (PA)	L/VREF	M/VREF	N/VREF	OT/VREF	(PST-P0)/PREF EXPT	THEORY	STP-AN	SE-FUNC	OT-FUNC
-75.0	-1.23	0.98	0.97	-0.33	-0.191	0.126	0.008	3.193	-0.228	-0.115			
-50.0	-1.00	0.71	0.20	-0.04	-0.121	0.007	0.031	0.153	-0.233	-0.124			
-25.0	-0.76	0.44	0.19	-0.09	-0.120	0.094	0.023	3.133	-0.239	-0.130			
0.0	-0.59	0.24	0.09	-0.48	-0.122	0.030	0.019	3.129	-0.223	-0.133	0.000	0.000	0.000
5.0	-1.11	0.19	0.10	-0.19	-0.130	0.010	0.012	0.130	-0.244	-0.133	-0.001	0.000	-0.000
10.0	-1.12	0.09	0.10	-0.72	-0.137	0.009	0.013	3.139	-0.236	-0.123	-0.003	0.001	-0.000
15.0	-1.20	0.04	0.10	-0.11	-0.147	0.005	0.022	3.149	-0.240	-0.133	-0.004	0.001	-0.000
20.0	-1.10	0.00	0.24	-0.50	-0.139	0.000	0.019	0.130	-0.227	-0.133	-0.010	0.002	-0.000
25.0	-1.10	0.12	0.24	-0.04	-0.149	0.019	0.020	0.140	-0.233	-0.133	-0.010	0.004	-0.000
30.0	-1.50	0.30	0.33	-0.20	-0.193	0.044	0.041	3.203	-0.249	-0.132	-0.029	0.009	-0.000
35.0	-1.29	0.34	0.37	-0.97	-0.194	0.042	0.040	0.109	-0.293	-0.131	-0.030	0.009	-0.001
40.0	-1.00	0.49	0.30	-0.79	-0.132	0.054	0.044	0.150	-0.232	-0.131	-0.040	0.011	-0.001
45.0	-1.41	0.62	0.41	-0.40	-0.173	0.070	0.091	0.190	-0.223	-0.130	-0.090	0.014	-0.002
50.0	-1.27	0.90	0.30	-0.09	-0.190	0.073	0.040	0.170	-0.239	-0.129	-0.073	0.010	-0.003
55.0	-1.37	0.00	0.40	-0.43	-0.160	0.084	0.097	3.190	-0.222	-0.127	-0.049	0.012	-0.004
60.0	-1.33	0.03	0.90	-7.93	-0.163	0.102	0.099	3.209	-0.209	-0.120	-0.100	0.027	-0.000
65.0	-1.97	0.03	0.91	-0.00	-0.192	0.102	0.002	3.220	-0.239	-0.124	-0.127	0.033	-0.009
70.0	-1.40	1.00	0.47	-0.07	-0.172	0.122	0.090	0.219	-0.229	-0.122	-0.190	0.030	-0.013
75.0	-1.24	1.00	0.47	-7.02	-0.192	0.123	0.097	3.204	-0.201	-0.120	-0.172	0.049	-0.017
80.0	-1.29	1.00	0.91	-0.51	-0.193	0.193	0.002	3.212	-0.229	-0.119	-0.194	0.090	-0.022
85.0	-1.29	1.10	0.94	-0.39	-0.193	0.143	0.000	3.219	-0.220	-0.110	-0.217	0.090	-0.029
90.0	-1.20	1.20	0.41	-0.29	-0.190	0.193	0.090	3.229	-0.219	-0.113	-0.243	0.042	-0.039
95.0	-1.00	1.30	0.40	-0.17	-0.132	0.190	0.090	3.210	-0.210	-0.111	-0.240	0.040	-0.043
100.0	-0.07	1.10	0.30	-7.00	-0.107	0.140	0.040	3.107	-0.203	-0.109	-0.209	0.072	-0.090
105.0	-0.02	1.33	0.02	-0.00	-0.100	0.102	0.070	3.209	-0.232	-0.100	-0.330	0.070	-0.097
110.0	-0.41	0.90	0.00	-0.10	-0.091	0.120	0.090	0.199	-0.210	-0.104	-0.320	0.070	-0.092
115.0	-0.30	0.07	0.77	-0.33	-0.042	0.110	0.090	3.197	-0.220	-0.103	-0.330	0.070	-0.044
120.0	-0.13	0.00	0.00	-0.40	-0.010	0.103	0.000	0.130	-0.273	-0.102	-0.340	0.070	-0.097
125.0	0.00	0.00	0.02	-0.17	0.004	0.100	0.070	3.132	-0.210	-0.101	-0.341	0.070	-0.047
130.0	0.20	0.70	0.99	-0.02	0.030	0.091	0.200	3.110	-0.230	-0.100	-0.390	0.070	-0.040
135.0	0.72	1.03	0.00	-0.70	0.000	0.120	0.040	3.173	-0.231	-0.090	-0.421	0.041	-0.047
140.0	1.40	1.93	0.01	-0.90	0.172	0.197	0.070	3.240	-0.230	-0.097	-0.447	0.040	-0.040
145.0	1.00	1.03	0.77	-0.10	0.230	0.100	0.090	3.320	-0.230	-0.099	-0.417	0.107	-0.011
150.0	0.99	1.70	0.00	-0.00	0.210	0.213	0.100	3.399	-0.241	-0.092	-0.490	0.141	-0.047

155.0	3.14	1.74	1.09	-9.27	0.384	0.213	3.13.	2.459	-3.243	-0.339	-0.339	0.339	0.111
160.0	3.33	1.75	1.28	-9.39	0.439	0.214	0.194	0.988	-9.771	-0.788	0.788	0.779	0.144
165.0	4.48	1.82	1.34	-8.96	0.449	0.239	0.168	0.976	-9.213	-0.983	0.776	0.347	0.912
170.0	4.24	1.89	1.53	-8.81	0.924	0.232	0.187	2.434	-8.180	-0.679	2.387	0.913	0.444
175.0	4.34	1.95	1.88	-9.38	0.938	0.239	0.203	0.821	-8.134	-0.978	2.738	0.847	0.999
180.0	4.23	1.87	1.80	-8.19	0.918	0.241	0.220	0.912	-8.109	-0.773	2.712	0.977	0.792
185.0	3.91	1.87	1.83	-2.64	0.829	0.249	0.224	0.924	-8.978	-0.876	0.874	0.924	0.903
190.0	2.48	1.38	1.78	-1.45	0.284	0.188	0.218	2.402	-2.844	0.388	1.884	1.000	1.888

Q3061

MASS FLOWRATES IN KG/S

PRIMARY PASS FLOW = 0.048
SECONDARY MASS FLOW = 0.123
M-TOTAL = 0.171
AT TEST SECTION M-TOTAL = 0.198
M-TOT(1/2 TEST SEC)/M-TOT(INLET) = 0.922

RECIRCULATION

M-BACK ON AXIS = 0.0534 DIMENSIONLESS 0.342
M-BACK AT WALL = 0.0000 0.000
TOTAL M-BACK = 0.0534 0.342

MOMENTUM FLUXES

ANGULAR MOMENTUM FLUX = 0.859 N-M DIMENSIONLESS 0.398
AXIAL MOMENTUM FLUX = 0.88 N 0.901
PRESSURE FORCE = 0.881 N 0.676
THRUST = 1.883 N 1.104
SWIRL NUMBER = 0.880
SWIRL NUMBER (0.883 THRUST) = 0.483

ENERGY FLUXES

AXIAL KINETIC ENERGY FLUX = 1.38 J/S DIMENSIONLESS 0.240
TAN KINETIC ENERGY FLUX = 0.31 0.655
TOTAL KINETIC ENERGY FLUX = 1.69 0.334
PRESSURE ENERGY FLUX = -0.76 -0.133
TOTAL FLOW ENERGY FLUX = 1.10 0.196

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.89 PA
VELOCITY = 2.17 M/S BASED ON THROAT DIAMETER OF 0.0782 M
REYNOLDS NO. = 0.84E 05

WARRING A PITCH ANGLE OF 91.2 DEG. WAS CALCULATED AT $\theta = 199.0$ MM. THIS POINT HAS BEEN ELIMINATED.

WARRING A PITCH ANGLE OF 93.7 DEG. WAS CALCULATED AT $\theta = 200.0$ MM. THIS POINT HAS BEEN ELIMINATED.

EXPERIMENT NO. 040M1

PROBE SIZE 0

STAND AIR TEMPERATURE = 43.0 C

BAROMETRIC PRESSURE = 752.0 TORR

R (MM)	U (IN/S)	V (IN/S)	W (IN/S)	PST-PV (PA)	U/VREF	V/VREF	W/VREF	VT/VREF	(PST-PV)/PREP EXPT THEORY	STREAP	ST-FUNC	ST-FUNC
-75.0	-0.76	0.33	1.99	-210.40	-0.179	0.100	0.093	0.292	-0.270	-0.101		
-90.0	-7.01	4.07	1.43	-223.74	-0.203	0.120	0.038	0.201	-0.217	-0.100		
-25.0	-0.06	2.32	0.47	-234.20	-0.231	0.002	0.012	0.239	-0.300	-0.210		
0.0	-0.05	0.24	0.95	-230.00	-0.241	0.000	0.019	0.201	-0.300	-0.214	0.000	0.000
5.0	-0.03	0.03	0.00	-237.41	-0.240	0.017	0.010	0.202	-0.300	-0.210	-0.001	-0.000
10.0	-0.23	1.09	1.00	-240.73	-0.245	0.020	0.020	0.200	-0.300	-0.213	-0.000	-0.000
15.0	-0.14	1.01	1.23	-230.79	-0.243	0.043	0.033	0.200	-0.300	-0.212	-0.010	-0.000
20.0	-0.17	2.27	1.27	-242.13	-0.244	0.000	0.034	0.204	-0.311	-0.210	-0.010	-0.000
25.0	-0.02	2.70	1.57	-230.70	-0.240	0.073	0.042	0.200	-0.300	-0.200	-0.010	-0.000
30.0	-0.02	3.35	1.57	-237.00	-0.239	0.000	0.042	0.200	-0.300	-0.200	-0.010	-0.000
35.0	-0.70	3.00	1.75	-230.73	-0.233	0.100	0.047	0.201	-0.300	-0.200	-0.004	-0.000
40.0	-0.33	0.44	1.00	-233.99	-0.227	0.110	0.040	0.201	-0.300	-0.200	-0.071	-0.000
45.0	-0.40	0.01	1.02	-220.30	-0.225	0.133	0.051	0.200	-0.293	-0.190	-0.000	-0.000
50.0	-0.10	0.40	2.03	-220.00	-0.210	0.140	0.030	0.200	-0.290	-0.192	-0.100	-0.000
55.0	-0.00	0.00	2.10	-221.00	-0.210	0.100	0.057	0.272	-0.200	-0.107	-0.100	-0.010
60.0	-7.00	0.35	2.20	-210.00	-0.212	0.100	0.050	0.270	-0.200	-0.100	-0.100	-0.010
65.0	-7.70	0.00	2.20	-210.00	-0.207	0.100	0.000	0.200	-0.270	-0.170	-0.170	-0.010
70.0	-7.03	7.30	2.20	-219.99	-0.203	0.100	0.050	0.207	-0.277	-0.173	-0.202	-0.010
75.0	-7.90	7.92	2.21	-210.00	-0.200	0.200	0.050	0.200	-0.270	-0.107	-0.210	-0.010
80.0	-7.20	7.70	2.32	-213.90	-0.190	0.207	0.002	0.200	-0.270	-0.102	-0.197	-0.010
85.0	-0.01	7.00	2.32	-200.00	-0.101	0.212	0.002	0.200	-0.200	-0.107	-0.200	-0.007
90.0	-0.00	0.00	2.43	-200.00	-0.173	0.210	0.000	0.200	-0.200	-0.101	-0.210	-0.000
95.0	-0.00	0.12	2.30	-200.70	-0.100	0.210	0.000	0.270	-0.200	-0.100	-0.200	-0.000
100.0	-5.23	0.00	2.35	-201.00	-0.130	0.210	0.000	0.200	-0.200	-0.100	-0.200	-0.000
105.0	-0.10	7.70	2.41	-190.00	-0.132	0.200	0.000	0.200	-0.200	-0.107	-0.200	-0.000
110.0	-5.70	7.00	2.00	-200.10	-0.100	0.200	0.000	0.230	-0.201	-0.100	-0.200	-0.000
115.0	-2.27	7.20	2.00	-202.10	-0.000	0.102	0.070	0.210	-0.200	-0.100	-0.200	-0.000
120.0	-0.00	0.37	2.00	-200.01	-0.022	0.170	0.007	0.100	-0.200	-0.107	-0.200	-0.100
125.0	0.00	0.00	2.00	-200.00	0.012	0.100	0.070	0.100	-0.200	-0.100	-0.200	-0.100
130.0	1.10	0.07	3.07	-201.00	0.031	0.120	0.000	0.100	-0.201	-0.100	-0.200	-0.100
135.0	3.07	7.20	2.40	-190.01	0.000	0.100	0.000	0.200	-0.200	-0.100	-0.200	-0.000
140.0	0.30	7.00	2.00	-211.70	0.100	0.110	0.070	0.201	-0.200	-0.100	-0.200	-0.000

145.0	9.03	9.78	3.98	-222.00	0.239	0.239	0.034	0.348	-0.299	-0.119	-0.332	0.132	-0.048
150.0	12.05	9.48	4.41	-226.34	0.331	0.281	0.117	0.439	-0.293	-0.111	-0.293	0.132	0.093
155.0	15.14	10.29	5.32	-223.12	0.403	0.274	0.142	0.501	-0.298	-0.106	-0.149	0.213	0.077
163.0	17.04	10.43	6.35	-208.10	0.475	0.283	0.148	0.578	-0.247	-0.101	-0.020	0.288	0.179
165.0	19.05	10.47	7.25	-194.82	0.531	0.292	0.193	0.638	-0.250	-0.099	0.131	0.389	0.290
170.0	21.43	10.88	8.28	-189.98	0.579	0.299	0.220	0.678	-0.218	-0.091	0.304	0.514	0.442
175.0	21.79	10.83	8.82	-139.71	0.988	0.283	0.239	0.887	-0.174	-0.087	0.448	0.853	0.890
180.0	20.87	10.89	9.18	-101.84	0.999	0.289	0.244	0.884	-0.131	-0.092	0.878	0.794	0.759
185.0	18.44	8.82	9.87	-61.37	0.481	0.237	0.297	0.803	-0.078	-0.070	0.853	0.917	0.901
190.0	13.17	6.42	9.13	-38.88	0.390	0.171	0.243	0.448	-0.047	0.000	1.000	1.000	1.000

Q 0041

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.209
 SECONDARY MASS FLOW = 0.991
 M-TOTAL = 0.797
 AT TEST SECTION M-TOTAL = 0.701
 M-TOT(1/2 TEST SECT/M-TOT(INLET)) = 0.929

RECIRCULATION

M-BACK ON AXIS = 0.3100 DIMENSIONLESS 0.442
 M-BACK AT WALL = 0.0389 0.000
 TOTAL M-BACK = 0.3100 0.442

MOMENTUM FLUXES

ANGULAR MOMENTUM FLUX = 1.921 N-m DIMENSIONLESS 0.702
 AREAL MOMENTUM FLUX = 19.98 N 0.763
 PRESSURE FORCE = 21.373 N 0.812
 THRUST = 41.397 N 1.494
 SWIRL NUMBER = 0.999
 SWIRL NUMBER (U.P.T. THRUST) = 0.663

ENERGY FLUXES

AREAL KINETIC ENERGY FLUX = 180.84 J/S DIMENSIONLESS 0.340
 TAN KINETIC ENERGY FLUX = 43.24 0.881
 TOTAL KINETIC ENERGY FLUX = 232.11 0.434
 PRESSURE ENERGY FLUX = -83.28 -0.158
 TOTAL FLOW ENERGY FLUX = 148.83 0.279

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
 VREF = 37.57 M/S BASED ON THROAT DIAMETER OF 0.0792 M
 REYNOLDS NO. = 0.387E 08

MINIST & PITCH ANGLE OF 49.2 DEG. WAS CALCULATED AT $R = 130.8$ MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF 46.6 DEG. WAS CALCULATED AT $R = 199.6$ MM. THIS POINT HAS BEEN ELIMINATED.

EXPERIMENT NO. 04011

PROBE SITE 6

QUARK AIR TEMPERATURE = 39.3 C

BAROMETRIC PRESSURE = 717.3 TORR

R (MM)	U (M/S)	V (M/S)	W (M/S)	PST-PP (PA)	L/VREF	U/VREF	V/VREF	W/VREF	PT/VREF	(PST-PP)/PREP		STREAM	GX-FUNC	GY-FUNC
										EXPT	THEORY			
-75.0	-1.00	1.03	0.27	-10.75	-0.207	0.127	0.034	0.249	-0.203	-0.223				
-50.0	-2.00	1.00	0.13	-12.10	-0.255	0.133	0.018	0.208	-0.321	-0.237				
-25.0	-2.22	0.93	-0.04	-11.03	-0.272	0.099	-0.009	0.290	-0.307	-0.250				
0.0	-2.13	0.11	0.27	-13.04	-0.261	0.014	0.033	0.264	-0.344	-0.295	0.000	0.000	0.000	
5.0	-2.02	0.21	0.20	-12.93	-0.240	0.026	0.032	0.291	-0.330	-0.294	-0.001	0.000	-0.000	
10.0	-2.20	0.30	0.45	-12.44	-0.279	0.037	0.099	0.207	-0.320	-0.293	-0.004	0.001	-0.000	
15.0	-2.36	0.57	0.40	-13.07	-0.280	0.070	0.097	0.303	-0.344	-0.290	-0.010	0.004	-0.000	
20.0	-2.18	0.94	0.47	-12.44	-0.280	0.068	0.090	0.282	-0.320	-0.240	-0.017	0.000	-0.000	
25.0	-2.22	0.70	0.42	-12.44	-0.273	0.093	0.091	0.292	-0.320	-0.249	-0.027	0.010	-0.001	
30.0	-2.07	0.88	0.47	-12.44	-0.293	0.100	0.090	0.282	-0.320	-0.241	-0.030	0.014	-0.001	
35.0	-1.93	0.96	0.47	-12.00	-0.230	0.110	0.097	0.270	-0.310	-0.237	-0.091	0.010	-0.002	
40.0	-1.00	1.00	0.90	-12.03	-0.240	0.134	0.001	0.282	-0.317	-0.233	-0.005	0.022	-0.003	
45.0	-1.00	1.23	0.92	-11.73	-0.243	0.190	0.004	0.293	-0.309	-0.220	-0.001	0.020	-0.009	
50.0	-1.04	1.20	0.67	-11.80	-0.228	0.190	0.002	0.200	-0.313	-0.223	-0.000	0.033	-0.007	
55.0	-1.00	1.30	0.99	-11.70	-0.243	0.100	0.007	0.303	-0.300	-0.210	-0.110	0.030	-0.000	
60.0	-1.00	1.91	5.12	-11.00	-0.221	0.100	0.070	0.290	-0.307	-0.213	-0.100	0.040	-0.013	
65.0	-1.02	1.03	7.99	-11.93	-0.224	0.200	0.073	0.300	-0.304	-0.207	-0.102	0.092	-0.017	
70.0	-1.00	1.00	0.04	-10.83	-0.220	0.104	0.070	0.304	-0.289	-0.201	-0.100	0.090	-0.022	
75.0	-1.05	1.04	0.03	-11.67	-0.227	0.220	0.077	0.320	-0.302	-0.199	-0.211	0.007	-0.020	
80.0	-1.03	1.00	0.70	-10.07	-0.200	0.203	0.091	0.290	-0.280	-0.100	-0.237	0.074	-0.030	
85.0	-1.07	1.72	0.09	-10.71	-0.180	0.210	0.070	0.200	-0.202	-0.104	-0.202	0.000	-0.043	
90.0	-1.07	1.73	0.97	-10.84	-0.180	0.213	0.070	0.207	-0.201	-0.170	-0.207	0.000	-0.090	
95.0	-1.20	1.00	0.71	-10.13	-0.192	0.200	0.007	0.200	-0.207	-0.174	-0.311	0.002	-0.090	
100.0	-1.10	1.01	0.00	-10.97	-0.100	0.221	0.001	0.277	-0.270	-0.100	-0.334	0.000	-0.000	
105.0	-0.91	1.74	0.04	-10.22	-0.111	0.213	0.070	0.293	-0.200	-0.100	-0.304	0.100	-0.073	
110.0	-0.00	1.71	0.01	-9.90	-0.100	0.200	0.070	0.240	-0.203	-0.101	-0.373	0.103	-0.000	
115.0	-0.47	1.90	0.97	-10.00	-0.090	0.101	0.070	0.212	-0.270	-0.197	-0.307	0.104	-0.000	
120.0	-0.13	1.22	0.71	-10.00	-0.010	0.190	0.007	0.174	-0.200	-0.100	-0.304	0.100	-0.007	
125.0	0.00	1.24	0.07	-11.00	0.000	0.192	0.002	0.173	-0.200	-0.100	-0.300	0.100	-0.000	
130.0	0.70	1.47	0.90	-11.10	0.000	0.100	0.100	0.231	-0.200	-0.100	-0.370	0.107	-0.070	
140.0	1.00	2.02	0.70	-10.01	0.227	0.207	0.007	0.300	-0.200	-0.104	-0.337	0.110	-0.000	
145.0	2.22	2.11	0.00	-12.00	0.272	0.200	0.100	0.303	-0.320	-0.100	-0.200	0.100	-0.020	

193.0	3.37	2.55	3.39	-10.95	0.380	0.317	0.121	0.910	-0.394	-0.133	-0.203	0.170	0.012
195.0	3.02	2.50	1.17	-13.32	0.080	0.306	0.143	0.970	-0.391	-0.127	-0.090	0.230	0.112
198.0	4.03	2.47	1.43	-9.14	0.494	0.303	0.175	0.880	-0.140	-0.121	0.021	0.107	0.200
165.0	4.02	2.49	1.62	-12.00	0.900	0.330	0.199	0.709	-0.342	-0.115	0.110	0.400	0.324
170.0	4.77	2.50	1.02	-0.90	0.909	0.313	0.223	0.700	-0.210	-0.109	0.310	0.930	0.401
175.0	4.00	2.40	2.03	-7.10	0.900	0.303	0.240	0.713	-0.100	-0.103	0.477	0.090	0.000
180.0	4.07	2.27	2.04	-5.92	0.973	0.270	0.250	0.624	-0.140	-0.090	0.041	0.704	0.730
185.0	3.03	2.10	2.00	-3.50	0.402	0.247	0.292	0.400	-0.094	-0.094	0.703	0.001	0.002
190.0	1.75	0.95	0.00	-3.00	0.215	0.110	0.011	0.244	-0.095	0.000	1.000	1.000	1.000

24061

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.040
SECONDARY MASS FLOW = 0.124
M-TOTAL = 0.170
AT TEST SECTION M-TOTAL = 0.100
M-TOT(1/2 TEST SEC)/M-TOT(1/2 INLET) = 1.000

RECIRCULATION

M-BACK ON AXIS = 0.0731 KG/S DIMENSIONLESS
0.390
M-BACK AT WALL = 0.0000 0.000
TOTAL M-BACK = 0.0731 0.390

MOMENTUM FLUXES

ANGULAR MOMENTUM FLUX = 0.092 N-M DIMENSIONLESS
0.070
AXIAL MOMENTUM FLUX = 1.13 N 0.019
PRESSURE FORCE = 1.199 N 0.793
THRUST = 2.329 N 1.003
SWIRL NUMBER = 1.000
SWIRL NUMBER (INLET THRUST) = 0.920

ENERGY FLUXES

AXIAL KINETIC ENERGY FLUX = 2.04 J/S DIMENSIONLESS
0.301
TAN KINETIC ENERGY FLUX = 0.03 0.112
TOTAL KINETIC ENERGY FLUX = 3.01 0.934
PRESSURE ENERGY FLUX = -1.30 -0.231
TOTAL FLOW ENERGY FLUX = 1.71 0.393

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
VREF = 0.10 M/S BASED ON THROAT DIAMETER OF 0.0702 M
REYNOLDS NO. = 0.0407 04

WARNING: A PITCH ANGLE OF 91.9 DEG. WAS CALCULATED AT R = 195.8 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF 101.3 DEG. WAS CALCULATED AT R = 200.0 MM. THIS POINT HAS BEEN ELIMINATED.

EXPERIMENT NO. 045M1

PROBE SIZE 0

STEARL AIR TEMPERATURE = 41.8 C

BAROMETRIC PRESSURE = 752.8 TORR

R (MM)	U (M/S)	V (M/S)	W (M/S)	PST-PH (PA)	U/VREF	W/VREF	V/VREF	WT/VREF	(PST-PH)/PREP		STREAP	GX-FUNC	GY-FUNC
									EXPT	THEORY			
-75.0	-7.00	0.00	2.00	-255.35	-0.100	0.100	0.000	0.272	-0.324	-0.200			
-80.0	-8.00	0.11	2.10	-247.04	-0.124	0.130	0.057	0.260	-0.315	-0.130			
-85.0	-9.07	2.70	1.05	-202.00	-0.202	0.074	0.020	0.274	-0.334	-0.244			
0.0	-10.00	0.00	0.31	-200.04	-0.100	0.002	0.000	0.201	-0.342	-0.150	0.000	0.000	0.000
0.0	-10.70	0.71	0.92	-270.45	-0.100	0.019	0.014	0.205	-0.344	-0.150	-0.001	0.000	-0.000
10.0	-10.25	1.03	0.01	-200.44	-0.172	0.041	0.022	0.270	-0.330	-0.240	-0.005	0.002	-0.000
15.0	-10.21	1.05	1.10	-200.03	-0.171	0.052	0.030	0.277	-0.320	-0.247	-0.013	0.004	-0.000
20.0	-10.40	2.00	1.40	-207.44	-0.170	0.000	0.040	0.207	-0.340	-0.245	-0.021	0.007	-0.000
25.0	-10.93	3.10	1.01	-272.39	-0.170	0.004	0.043	0.205	-0.340	-0.242	-0.032	0.011	-0.001
30.0	-10.10	3.71	1.07	-207.01	-0.170	0.000	0.050	0.202	-0.330	-0.230	-0.047	0.019	-0.001
35.0	-9.42	4.30	1.00	-200.39	-0.101	0.117	0.050	0.200	-0.335	-0.230	-0.003	0.021	-0.002
40.0	-9.00	0.00	1.17	-200.00	-0.100	0.134	0.050	0.200	-0.330	-0.231	-0.001	0.020	-0.000
45.0	-9.00	0.00	2.10	-207.00	-0.100	0.140	0.000	0.300	-0.327	-0.227	-0.101	0.033	-0.000
50.0	-9.10	0.21	2.10	-201.03	-0.100	0.100	0.001	0.300	-0.310	-0.221	-0.100	0.030	-0.000
55.0	-9.01	0.73	2.33	-207.00	-0.100	0.170	0.002	0.300	-0.310	-0.210	-0.107	0.040	-0.012
60.0	-8.07	7.24	2.30	-200.00	-0.100	0.100	0.004	0.310	-0.312	-0.210	-0.170	0.004	-0.010
65.0	-8.40	7.04	2.41	-200.00	-0.100	0.100	0.004	0.312	-0.300	-0.203	-0.200	0.001	-0.022
70.0	-8.30	0.07	2.40	-241.20	-0.100	0.214	0.000	0.310	-0.307	-0.107	-0.200	0.000	-0.020
75.0	-8.10	0.30	2.41	-234.20	-0.100	0.222	0.004	0.310	-0.290	-0.100	-0.200	0.077	-0.030
80.0	-7.01	0.00	2.40	-220.13	-0.100	0.230	0.000	0.310	-0.290	-0.100	-0.200	0.000	-0.040
85.0	-7.30	0.00	2.51	-223.40	-0.100	0.230	0.007	0.300	-0.200	-0.177	-0.320	0.002	-0.050
90.0	-7.22	0.00	2.50	-221.32	-0.100	0.230	0.000	0.311	-0.201	-0.171	-0.302	0.100	-0.000
95.0	-8.40	0.00	2.50	-221.02	-0.100	0.237	0.000	0.301	-0.202	-0.100	-0.300	0.107	-0.070
100.0	-9.70	0.00	2.00	-210.57	-0.100	0.230	0.071	0.200	-0.270	-0.100	-0.410	0.112	-0.007
105.0	-8.70	0.00	2.00	-217.70	-0.100	0.220	0.070	0.270	-0.277	-0.100	-0.400	0.117	-0.007
110.0	-3.00	0.20	2.00	-217.00	-0.100	0.210	0.000	0.270	-0.270	-0.100	-0.400	0.120	-0.100
115.0	-2.00	7.00	1.00	-210.23	-0.070	0.200	0.000	0.220	-0.277	-0.100	-0.400	0.122	-0.110
120.0	-1.20	7.00	2.71	-210.47	-0.031	0.107	0.072	0.200	-0.270	-0.100	-0.400	0.123	-0.117
125.0	0.00	0.00	2.70	-220.00	0.000	0.171	0.070	0.100	-0.200	-0.100	-0.400	0.123	-0.110
130.0	1.00	0.00	2.00	-221.00	0.001	0.100	0.070	0.100	-0.201	-0.100	-0.400	0.123	-0.117
135.0	3.00	0.00	2.00	-230.00	0.002	0.100	0.070	0.210	-0.201	-0.100	-0.400	0.120	-0.110
140.0	0.00	0.00	1.10	-241.00	0.100	0.220	0.000	0.200	-0.307	-0.100	-0.400	0.131	-0.000

149.0	9.11	9.33	3.72	-438.61	0.242	0.240	0.998	0.180	-0.304	-0.120	-0.328	0.149	-0.093
150.0	12.33	10.27	4.44	-238.78	0.327	0.273	0.124	0.444	-0.389	-0.124	-0.388	0.173	-0.013
155.0	19.98	10.82	9.82	-238.93	0.419	0.282	0.149	0.922	-0.382	-0.119	-0.140	0.222	0.088
160.0	18.63	10.92	7.10	-210.73	0.474	0.290	0.191	0.991	-0.768	-0.114	-0.047	0.294	0.157
165.0	20.97	11.90	8.44	-198.61	0.548	0.389	0.224	0.889	-0.392	-0.100	0.000	0.392	0.281
170.0	12.21	12.42	8.11	-176.83	0.593	0.298	0.242	0.793	-0.232	-0.103	0.270	0.518	0.628
175.0	22.37	11.10	9.83	-135.05	0.599	0.299	0.281	0.717	-0.172	-0.098	0.483	0.894	0.988
180.0	21.39	10.43	10.77	-78.67	0.588	0.277	0.288	0.893	-0.101	-0.093	0.899	0.783	0.749
185.0	19.27	9.48	10.05	-78.28	0.511	0.292	0.287	0.829	-0.048	-0.048	0.844	0.815	0.894
190.0	13.08	7.14	9.41	-50.81	0.349	0.188	0.258	0.494	-0.084	0.000	1.000	1.000	1.000

245 H1

MASS FLOW RATES IN KG/S

PRIMARY MASS FLOW = 0.208
 SECONDARY MASS FLOW = 0.998
 M-TOTAL = 0.782
 AT TEST SECTION M-TOTAL = 0.699
 M-TOT(TEST SEC)/M-TOT(INLET) = 0.912

RECIRCULATION

KG/S DIMENSIONLESS
 M-BACK ON AXIS = 0.3493 0.498
 M-BACK AT WALL = 0.0000 0.000
 TOTAL M-BACK = 0.3493 0.498

MOMENTUM FLUXES

ANGULAR MOMENTUM FLUX = 1.818 N-m DIMENSIONLESS 0.739
 AXIAL MOMENTUM FLUX = 21.82 N 0.793
 PRESSURE FORCE = 22.921 N 0.879
 THRUST = 44.938 N 1.991
 SWIRL NUMBER = 0.991
 SWIRL NUMBER (W.R.T. THRUST) = 0.478

ENERGY FLUXES

J/S DIMENSIONLESS
 AXIAL KINETIC ENERGY FLUX = 173.89 0.321
 TAN KINETIC ENERGY FLUX = 48.87 0.087
 TOTAL KINETIC ENERGY FLUX = 297.18 0.479
 PRESSURE ENERGY FLUX = -78.89 -0.142
 TOTAL FLOW ENERGY FLUX = 188.94 0.334

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
 VREF = 37.87 M/S BASED ON THROAT DIAMETER OF 0.0762 M
 REYNOLDS NO. = 0.389E 06

WINDSPEED & PITCH ANGLE OF 88.9 CTS, WAS CALCULATED AT 184.6 MS. THIS POINT WAS THEN ELIMINATED.

EXPERIMENT NO. 04511

PROBE SITE 6

AIR TEMPERATURE = 32.5 C

BAROMETRIC PRESSURE = 757.3 TORR

W	U	V	W	PST-PO	U/UREF	V/UREF	W/UREF	VT/UREF	(PST-PO)/PREP	STRENGTH	EX-FUNC	GT-FUNC
(MM)	(M/S)	(M/S)	(M/S)	(PA)					EXPT	THEORY		
-75.0	-2.12	1.32	0.33	-11.96	-0.285	0.164	0.041	0.313	-0.320	-0.260		
-90.0	-2.34	1.08	0.18	-12.31	-0.290	0.135	0.019	0.321	-0.337	-0.270		
-25.0	-2.08	0.43	-0.06	-14.01	-0.334	0.053	-0.008	0.330	-0.379	-0.290		
0.0	-2.48	0.35	0.22	-13.72	-0.388	0.043	0.027	0.310	-0.387	-0.293	0.000	0.000
5.0	-2.43	0.44	0.20	-13.08	-0.298	0.095	0.035	0.305	-0.390	-0.290	-0.001	0.000
10.0	-2.81	0.58	0.35	-13.10	-0.324	0.072	0.043	0.335	-0.380	-0.264	-0.000	0.002
15.0	-2.44	0.72	0.40	-13.70	-0.302	0.088	0.059	0.321	-0.368	-0.279	-0.013	0.009
20.0	-2.24	0.61	0.42	-11.96	-0.278	0.101	0.052	0.300	-0.347	-0.274	-0.023	0.008
25.0	-2.37	0.03	0.43	-13.10	-0.284	0.118	0.094	0.321	-0.392	-0.288	-0.039	0.012
30.0	-2.33	1.11	0.40	-13.55	-0.289	0.138	0.080	0.320	-0.382	-0.283	-0.090	0.017
35.0	-2.27	1.21	0.50	-13.14	-0.282	0.190	0.082	0.328	-0.391	-0.297	-0.087	0.023
40.0	-2.15	1.20	0.92	-12.82	-0.288	0.198	0.085	0.318	-0.337	-0.290	-0.084	0.030
45.0	-2.10	1.47	0.99	-12.72	-0.281	0.193	0.080	0.320	-0.340	-0.243	-0.108	0.038
50.0	-2.12	1.49	0.88	-11.91	-0.282	0.194	0.082	0.331	-0.345	-0.236	-0.131	0.044
55.0	-1.92	1.81	0.84	-12.27	-0.238	0.208	0.070	0.321	-0.328	-0.220	-0.198	0.051
60.0	-1.84	1.72	0.81	-12.14	-0.241	0.213	0.070	0.331	-0.319	-0.222	-0.181	0.059
65.0	-1.80	1.80	0.84	-12.40	-0.248	0.235	0.070	0.390	-0.334	-0.214	-0.210	0.067
70.0	-2.07	2.08	0.70	-14.00	-0.297	0.295	0.088	0.372	-0.374	-0.209	-0.242	0.078
75.0	-1.81	1.98	0.80	-11.98	-0.229	0.243	0.081	0.343	-0.388	-0.198	-0.279	0.088
80.0	-1.88	1.98	0.88	-11.44	-0.208	0.248	0.082	0.331	-0.388	-0.180	-0.308	0.094
85.0	-1.90	1.99	0.89	-11.98	-0.187	0.247	0.081	0.328	-0.318	-0.181	-0.337	0.101
90.0	-1.40	1.94	0.79	-10.87	-0.174	0.241	0.093	0.312	-0.283	-0.174	-0.388	0.108
95.0	-1.22	1.84	0.72	-10.78	-0.191	0.231	0.089	0.298	-0.288	-0.180	-0.390	0.113
100.0	-1.17	1.95	0.69	-10.92	-0.148	0.242	0.088	0.298	-0.281	-0.183	-0.423	0.118
105.0	-1.02	1.70	0.69	-9.93	-0.128	0.221	0.081	0.287	-0.289	-0.197	-0.449	0.122
110.0	-0.88	1.79	0.68	-10.89	-0.107	0.217	0.082	0.299	-0.294	-0.193	-0.473	0.128
115.0	-0.64	1.90	0.77	-9.78	-0.094	0.180	0.098	0.217	-0.281	-0.180	-0.489	0.127
120.0	-0.28	1.40	0.97	-10.30	-0.034	0.174	0.120	0.214	-0.277	-0.167	-0.489	0.128
125.0	0.09	1.71	0.88	-12.03	0.066	0.213	0.089	0.218	-0.322	-0.163	-0.502	0.129
130.0	0.37	1.99	0.87	-11.70	0.048	0.192	0.083	0.219	-0.319	-0.140	-0.488	0.128
135.0	0.71	1.02	0.71	-11.21	0.088	0.178	0.088	0.219	-0.380	-0.138	-0.479	0.130
140.0	1.02	1.98	0.69	-12.33	0.170	0.230	0.105	0.313	-0.322	-0.139	-0.449	0.138
145.0	1.07	2.19	0.69	-12.09	0.248	0.287	0.109	0.377	-0.323	-0.130	-0.388	0.199
150.0	2.08	2.13	1.43	-11.99	0.333	0.289	0.127	0.499	-0.388	-0.124	-0.388	0.178

155.0	3.36	2.38	0.88	-11.86	0.417	0.192	0.110	0.929	-0.311	-0.110	-0.201	0.227	0.891
160.0	3.62	2.40	1.33	-10.60	0.404	0.303	0.180	0.990	-0.260	-0.114	-0.080	0.290	0.190
165.0	4.47	2.93	1.71	-9.76	0.499	0.314	0.212	0.972	-0.260	-0.104	0.091	0.390	0.202
170.0	4.81	2.98	1.80	-9.81	0.507	0.317	0.223	0.711	-0.241	-0.102	0.272	0.322	0.620
175.0	4.88	2.40	2.11	-9.94	0.605	0.290	0.202	0.724	-0.160	-0.090	0.447	0.162	0.990
180.0	4.71	2.38	2.11	-4.48	0.900	0.290	0.202	0.700	-0.131	-0.092	0.000	0.002	0.740
185.0	4.82	2.10	2.21	-3.10	0.499	0.271	0.274	0.830	-0.087	-0.087	0.091	0.923	0.197
190.0	2.03	1.98	2.10	-0.67	0.367	0.187	0.200	0.470	-0.002	0.000	1.000	1.000	1.000

Q45L1

MASS FLOWRATES IN KG/S

PRIMARY PASS FLOW = 0.040
SECONDARY MASS FLOW = 0.123
M-TOTAL = 0.160
AT TEST SECTION M-TOTAL = 0.155
M-TOT(1)TEST SECI/M-TOT(INLET) = 0.917

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS =	0.0781	0.903
M-BACK AT WALL =	0.0000	0.000
TOTAL M-BACK =	0.0781	0.903

MOMENTUM FLUXES

		DIMENSIONLESS
ANGULAR MOMENTUM FLUX =	0.001 N-M	0.781
AXIAL MOMENTUM FLUX =	1.05 N	0.770
PRESSURE FORCE =	1.133 N	0.900
THRUST =	1.104 N	1.000
SWIRL NUMBER =		1.816
SWIRL NUMBER (U.R.T. THRUST) =		0.400

ENERGY FLUXES

	J/S	DIMENSIONLESS
AXIAL KINETIC ENERGY FLUX =	1.41	0.320
TAN KINETIC ENERGY FLUX =	0.32	0.000
TOTAL KINETIC ENERGY FLUX =	1.67	0.400
PRESSURE ENERGY FLUX =	-0.70	-0.143
TOTAL FLOW ENERGY FLUX =	1.00	0.342

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
VREP = 1.00 M/S BASED ON THROAT DIAMETER OF 0.0781 m
REYNOLDS NO. = 0.0000 00

TRANSITION SECTION EXIT

WARNING: A PITCH ANGLE OF 114.9 DEG, WAS CALCULATED AT W 0 740.6 WP. THIS POINT HAS BEEN ELIMINATED.

EXPERIMENT NO. 1700M2

PAGE SIX T

TUNNEL AIR TEMPERATURE = 37.0 C

BAROMETRIC PRESSURE = 759.2 TORR

(IN)	U (M/S)	U (M/S)	U (M/S)	PST-Pd (PA)	U/VREF	U/VREF	U/VREF	U/VREF	(PST-Pd)/PREF EXPT THEORY	STREAM	OX-FUNC	ST-Pd	
0.0	24.03	0.00	2.00	-32.97	0.475	0.000	0.057	0.077	-0.043	-0.013	0.000	0.000	0.000
20.0	29.49	0.00	2.20	-29.78	0.783	0.000	0.083	0.788	-0.039	-0.013	0.028	0.093	0.000
40.0	24.40	0.00	2.52	-11.10	0.088	0.000	0.059	0.089	-0.014	-0.013	0.101	0.202	0.000
60.0	20.00	0.00	2.02	-34.01	0.948	0.000	0.077	0.952	-0.044	-0.013	0.211	0.304	0.000
80.0	14.60	0.31	2.01	-29.41	0.387	0.014	0.079	0.409	-0.033	-0.013	0.330	0.999	0.000
100.0	10.75	0.19	3.52	24.75	0.292	0.000	0.088	0.300	0.039	-0.013	0.442	0.673	0.213
120.0	9.01	0.00	3.29	-9.30	0.287	0.000	0.088	0.281	-0.012	-0.013	0.599	0.789	0.290
140.0	0.03	0.00	2.10	-21.88	0.210	0.000	0.097	0.220	-0.028	-0.013	0.671	0.847	0.290
160.0	0.09	1.19	3.21	-81.99	0.107	0.031	0.087	0.200	-0.001	-0.013	0.703	0.913	0.825
180.0	9.13	0.00	1.03	-39.75	0.138	0.000	0.072	0.197	-0.090	-0.013	0.884	0.362	1.000
200.0	3.47	0.00	2.82	-37.01	0.094	0.000	0.071	0.110	-0.048	-0.013	0.989	0.990	1.000
220.0	0.00	0.00	0.00	-14.67	0.000	0.000	0.000	0.000	-0.010	-0.013	1.000	1.000	1.000
240.0	0.00	0.00	0.00	-38.88	0.000	0.000	0.000	0.000	-0.048	-0.013	1.000	1.000	1.000
260.0	0.00	0.00	0.00	-24.24	0.000	0.000	0.000	0.000	-0.032	-0.013	1.000	1.000	1.000
280.0	0.00	0.00	0.00	-24.00	0.000	0.000	0.000	0.000	-0.031	-0.013	1.000	1.000	1.000
300.0	0.00	0.00	0.00	-13.33	0.000	0.010	0.000	0.000	-0.017	-0.013	1.000	1.000	1.000
320.0	0.00	0.00	0.00	-19.20	0.000	0.000	0.000	0.000	-0.020	-0.013	1.000	1.000	1.000
340.0	0.00	0.00	0.00	-9.87	0.000	0.000	0.000	0.000	-0.013	-0.013	1.000	1.000	1.000
360.0	0.00	0.00	0.00	-0.00	0.000	0.000	0.000	0.000	0.000	0.000	1.000	1.000	1.000

1T00H2

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.209
SECONDARY MASS FLOW = 0.554
M-TOTAL = 0.763
AT TEST SECTION M-TOTAL = 1.424
M-TOT(TEST SEC)/M-TOT(INLET) = 1.066

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS =	0.0000	0.000
M-BACK AT WALL =	0.0000	0.000
TOTAL M-BACK =	0.0000	0.000

MOMENTUM FLUXES

		DIMENSIONLESS
ANGULAR MOMENTUM FLUX =	0.039 N-M	0.010
AXIAL MOMENTUM FLUX =	17.03 N	0.830
PRESSURE FORCE =	10.081 N	0.192
THRUST =	27.082 N	0.997
SWIRL NUMBER =		0.010
SWIRL NUMBER IN R.T. THRUST =		0.010

ENERGY FLUXES

	J/S	DIMENSIONLESS
AXIAL KINETIC ENERGY FLUX =	147.60	0.240
TAN KINETIC ENERGY FLUX =	0.13	0.000
TOTAL KINETIC ENERGY FLUX =	153.30	0.207
PRESSURE ENERGY FLUX =	-20.33	-0.097
TOTAL FLOW ENERGY FLUX =	124.04	0.240

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
VREP = 38.78 M/S BASED ON THROAT DIAMETER OF 0.0762 M.
REYNOLDS NO. = 0.379E 06

EXPERIMENT NO. 1700H2

PROBE SIZE 7

TUNNEL AIR TEMPERATURE = 42.5 C

BAROMETRIC PRESSURE = 752.0 TORR

Q (MM)	U (M/S)	V (M/S)	W (M/S)	PST-PA (PA)	U/VREF	L/VREF	V/VREF	WT/VREF	(PST-PA)/PREF		STREAM	SX-PUNC	OT-PA
									EXPT	THEORY			
0.0	13.00	0.00	1.00	-11.02	0.300	0.000	0.020	0.370	-0.015	-0.001	0.000	0.000	0.000
20.0	10.04	0.00	1.43	-24.07	0.425	0.000	0.030	0.427	-0.032	-0.006	0.000	0.012	0.000
40.0	10.35	0.00	2.00	7.17	0.430	0.000	0.074	0.445	0.000	-0.004	0.031	0.050	0.000
60.0	10.79	0.00	3.20	-20.13	0.445	0.010	0.000	0.454	-0.030	-0.006	0.070	0.110	0.000
80.0	10.03	0.72	3.73	-71.70	0.450	0.010	0.000	0.500	-0.001	-0.007	0.130	0.212	0.100
100.0	10.00	0.70	3.67	-40.64	0.424	0.020	0.007	0.430	-0.000	-0.007	0.103	0.340	0.200
120.0	10.00	0.70	3.50	-03.00	0.410	0.010	0.000	0.421	-0.001	-0.007	0.100	0.477	0.400
140.0	12.02	0.00	3.40	-00.20	0.340	0.010	0.001	0.352	-0.070	-0.007	0.071	0.500	0.500
160.0	10.02	0.10	2.50	-27.03	0.290	0.000	0.000	0.200	-0.030	-0.007	0.000	0.007	0.710
180.0	0.00	0.17	3.01	-41.01	0.210	0.004	0.003	0.233	-0.000	-0.007	0.030	0.770	0.770
200.0	7.20	0.00	2.00	-34.03	0.190	0.002	0.070	0.200	-0.044	-0.007	0.000	0.022	0.010
220.0	0.72	0.00	3.04	-10.02	0.102	0.010	0.004	0.170	-0.000	-0.007	0.000	0.004	0.010
240.0	0.40	0.00	2.01	-27.00	0.110	0.000	0.007	0.130	-0.030	-0.007	0.710	0.000	1.000
260.0	0.70	0.00	2.72	-20.00	0.120	0.000	0.072	0.140	-0.020	-0.007	0.770	0.010	1.000
280.0	0.00	0.00	0.00	-11.07	0.000	0.000	0.000	0.000	-0.010	-0.007	0.000	0.032	1.000
300.0	0.70	0.00	2.27	-23.71	0.120	0.000	0.000	0.140	-0.030	-0.007	0.030	0.040	1.000
320.0	3.02	0.00	2.20	-13.01	0.000	0.000	0.000	0.000	-0.017	-0.007	0.000	0.070	1.000
340.0	3.10	0.00	1.01	-19.00	0.004	0.000	0.040	0.000	-0.020	-0.007	0.041	0.000	1.000
360.0	1.07	0.00	1.03	-14.74	0.002	0.000	0.030	0.000	-0.010	-0.007	0.040	0.007	1.000
380.0	0.00	0.00	0.00	-0.27	0.000	0.000	0.000	0.000	-0.010	-0.007	1.000	1.000	1.000
400.0	0.00	0.00	0.00	-0.07	0.000	0.000	0.000	0.000	-0.007	-0.007	1.000	1.000	1.000
410.0	0.00	0.00	0.00	-0.00	0.000	0.000	0.000	0.000	0.000	0.000	1.000	1.000	1.000

2T00H2

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.885
 SECONDARY MASS FLOW = 0.957
 M-TOTAL = 0.782
 AT TEST SECTION M-TOTAL = 2.845
 M-TOT(1/TEST SEC)/M-TOT(INLET) = 3.864

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS =	0.0000	0.000
M-BACK AT WALL =	0.0000	0.000
TOTAL M-BACK =	0.0000	0.000

MOMENTUM FLUXES

		DIMENSIONLESS
ANGULAR MOMENTUM FLUX =	0.111 N-M	0.050
AXIAL MOMENTUM FLUX =	29.57 N	1.028
PRESSURE FORCE =	11.638 N	0.109
THRUST =	41.195 N	1.433
SUURL NUMBER =		0.849
SUURL NUMBER (V.R.T. THRUST) =		0.035

ENERGY FLUXES

	J/S	DIMENSIONLESS
AXIAL KINETIC ENERGY FLUX =	191.43	0.314
TAN KINETIC ENERGY FLUX =	0.27	0.001
TOTAL KINETIC ENERGY FLUX =	195.44	0.378
PRESSURE ENERGY FLUX =	-93.69	-0.172
TOTAL FLOW ENERGY FLUX =	112.34	0.207

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
 VREF = 37.71 M/S BASED ON THROAT DIAMETER OF 0.0782 M
 REYNOLDS NO. = 6.388E 06

WARNING: A PITCH ANGLE OF 134.3 DEG. WAS CALCULATED AT R = 338.8 MM. THIS POINT HAS BEEN ELIMINATED.

EXPERIMENT NO. 3700H1

PROBE SITE Y

TUNNEL AIR TEMPERATURE = 42.6 C

BAROMETRIC PRESSURE = 756.8 TORR

(MM)	U (M/S)	V (M/S)	W (M/S)	PST-PU (PA)	U/VREF	U/VREF	V/VREF	W/VREF	(PST-PU)/PREP EXPT THEORY	STREAM	OR-FUNC	OT-FU	
0.0	9.81	0.00	-0.03	-19.78	0.198	0.020	-0.011	0.140	-0.029	-0.011	0.000	0.000	0.000
20.0	7.13	0.00	0.20	-22.58	0.191	0.018	0.008	0.191	-0.029	-3.011	0.003	0.004	0.002
40.0	7.83	0.44	0.00	-17.84	0.212	0.013	0.010	0.213	-0.023	-0.011	0.019	0.010	0.004
60.0	9.17	0.00	1.99	-27.25	0.240	0.002	0.041	0.240	-0.029	-0.011	0.030	0.043	0.007
80.0	9.20	0.05	2.10	-28.00	0.247	0.017	0.050	0.239	-0.029	-0.011	0.007	0.009	0.022
100.0	10.00	0.35	2.00	-19.74	0.260	0.009	0.050	0.279	-0.029	-0.011	0.110	0.104	0.040
120.0	0.31	0.15	2.10	-19.03	0.222	0.004	0.050	0.229	-0.020	-0.011	0.150	0.200	0.000
140.0	9.00	0.20	2.42	-29.72	0.205	0.007	0.005	0.272	-0.030	-0.011	0.210	0.207	0.003
160.0	10.00	0.20	2.00	-42.02	0.203	0.000	0.072	0.302	-0.055	-0.010	0.204	0.403	0.101
180.0	9.00	0.00	2.11	-10.90	0.242	0.000	0.050	0.240	-0.021	-0.010	0.377	0.923	0.170
220.0	3.04	0.03	1.70	-11.43	0.103	0.001	0.044	0.113	-0.019	-0.010	0.492	0.050	0.170
240.0	0.00	0.14	2.41	-30.94	0.219	0.004	0.004	0.220	-0.047	-0.010	0.900	0.717	0.201
260.0	9.07	0.10	2.00	-7.00	0.191	0.003	0.003	0.101	-0.010	-0.010	0.000	0.001	0.230
280.0	3.03	0.31	1.32	-11.90	0.094	0.000	0.039	0.101	-0.019	-0.010	0.710	0.043	0.200
300.0	9.33	0.34	1.91	-10.32	0.142	0.009	0.040	0.140	-0.021	-0.010	0.773	0.009	0.370
340.0	2.27	0.30	1.24	-0.97	0.001	0.010	0.033	0.070	-0.000	-0.010	0.000	0.057	0.000
360.0	2.29	0.44	0.02	-10.10	0.001	0.012	0.022	0.004	-0.013	-0.010	0.020	0.070	0.000
380.0	0.00	0.00	0.00	-0.27	0.000	0.000	0.000	0.000	-0.000	-0.010	0.040	0.077	0.007
400.0	3.00	0.30	1.01	-0.00	0.003	0.020	0.027	0.031	-0.010	-0.010	0.070	0.000	0.070
410.3	0.00	0.00	0.00	-0.00	0.000	0.000	0.000	0.000	0.000	0.000	1.000	1.000	1.000

370041

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.299
 SECONDARY MASS FLOW = 0.994
 M-TOTAL = 0.799
 AT TEST SECTION M-TOTAL = 2.999
 M-TOT(1)TEST SECI/M-TOT(1)INLET = 3.783

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS	0.0000	0.000
M-BACK AT WALL	0.0000	0.000
TOTAL M-BACK	0.0000	0.000

MOMENTUM FLUXES

	KG/S	DIMENSIONLESS
ANGULAR MOMENTUM FLUX	0.191 N-m	0.014
AXIAL MOMENTUM FLUX	19.83 N	0.008
PRESSURE FORCE	7.991 N	0.071
THRUST	27.388 N	0.083
SWIRL NUMBER		0.128
SWIRL NUMBER (W.R.T. THRUST)		0.092

ENERGY FLUXES

	J/S	DIMENSIONLESS
AXIAL KINETIC ENERGY FLUX	80.31	0.191
TAN KINETIC ENERGY FLUX	0.18	0.000
TOTAL KINETIC ENERGY FLUX	45.98	0.161
PRESSURE ENERGY FLUX	-91.11	-0.008
TOTAL FLOW ENERGY FLUX	34.77	0.069

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
 VREF = 37.44 M/S BASED ON THROAT DIAMETER OF 0.0782 M
 REYNOLDS NO. = 0.316E 06

WARNING: A PITCH ANGLE OF 45.8 DEG. WAS CALCULATED AT R = 148.8 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF 44.8 DEG. WAS CALCULATED AT R = 198.8 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF 41.1 DEG. WAS CALCULATED AT R = 228.8 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF 34.4 DEG. WAS CALCULATED AT R = 248.8 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF 32.5 DEG. WAS CALCULATED AT R = 288.8 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF 29.8 DEG. WAS CALCULATED AT R = 288.8 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF 28.8 DEG. WAS CALCULATED AT R = 308.8 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF 44.8 DEG. WAS CALCULATED AT R = 328.8 MM. THIS POINT HAS BEEN ELIMINATED.

EXPERIMENT NO. 1765H1

PROBE SITE Y

TUNNEL AIR TEMPERATURE = 39.3 C

BAROMETRIC PRESSURE = 759.0 TORR

R (MM)	U (M/S)	V (M/S)	W (M/S)	PST-Ps (PA)	U/VREF	V/VREF	W/VREF	WT/VREF	(PST-Ps)/PREP EXPT THEORY	STREAM	SR-FUNC	ST-FUN
0.0	20.90	1.29	2.88	-37.11	0.955	0.034	0.074	0.941	-0.044 -0.021	0.000	0.000	0.000
20.0	22.28	0.97	3.02	-42.02	0.801	0.026	0.108	0.911	-0.054 -0.020	0.014	0.029	0.001
40.0	22.29	0.19	4.98	-38.12	0.803	0.005	0.135	0.819	-0.049 -0.019	0.055	0.108	0.002
60.0	21.28	0.19	5.40	-45.61	0.978	0.005	0.146	0.994	-0.059 -0.019	0.121	0.219	0.009
80.0	18.84	0.45	5.88	-41.88	0.984	0.019	0.153	0.927	-0.054 -0.019	0.288	0.358	0.014
100.0	19.85	1.29	5.79	-51.71	0.428	0.034	0.196	0.459	-0.087 -0.019	0.308	0.492	0.042
120.0	12.87	1.82	5.72	-39.87	0.391	0.049	0.159	0.387	-0.058 -0.019	0.397	0.587	0.098
140.0	10.40	2.93	5.85	-38.13	0.281	0.089	0.193	0.328	-0.049 -0.017	0.489	0.697	0.182
160.0	8.85	2.78	5.93	-39.91	0.218	0.079	0.188	0.281	-0.048 -0.018	0.579	0.781	0.292
240.0	8.41	2.32	1.82	-11.87	0.811	0.083	0.044	0.877	-0.019 -0.008	0.987	0.988	0.987
260.0	8.55	2.48	9.82	-12.89	0.819	0.087	0.028	0.873	-0.017 -0.007	0.977	0.989	0.938
280.0	8.23	2.98	0.88	-8.12	0.889	0.088	0.018	0.871	-0.008 -0.007	0.987	1.000	0.988
400.0	8.42	1.87	0.38	-4.82	0.811	0.091	0.018	0.883	-0.008 -0.008	0.988	1.000	0.981
614.8	8.88	0.88	0.88	-8.88	0.888	0.888	0.888	0.888	0.888 0.888	1.000	1.000	1.000

ATOSHI

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.889
 SECONDARY MASS FLOW = 0.997
 M-TOTAL = 0.762
 AT TEST SECTION M-TOTAL = 2.318
 M-TOT(TEST SECI/M-TOT(INLET) = 3.038

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS =	0.0000	0.000
M-BACK AT WALL =	0.0000	0.000
TOTAL M-BACK =	0.0000	0.000

MOMENTUM FLUXES

		DIMENSIONLESS
ANGULAR MOMENTUM FLUX =	0.784 N-m	0.328
AXIAL MOMENTUM FLUX =	28.95 N	0.998
PRESSURE FORCE =	9.889 N	0.113
THRUST =	37.748 N	1.348
SWIRL NUMBER =		0.328
SWIRL NUMBER (W.P.T. THRUST) =		0.249

ENERGY FLUXES

	J/S	DIMENSIONLESS
AXIAL KINETIC ENERGY FLUX =	213.96	0.488
TAN KINETIC ENERGY FLUX =	5.31	0.018
TOTAL KINETIC ENERGY FLUX =	252.77	0.488
PRESSURE ENERGY FLUX =	-73.14	-0.141
TOTAL FLOW ENERGY FLUX =	179.82	0.345

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.88 PA
 VREP = 38.95 M/S BASED ON THROAT DIAMETER OF 0.0762 M
 REYNOLDS NO. = 0.361E 08

EXPERIMENT NO. 270343

PROBE SITE T

TUNNEL AIR TEMPERATURE @ 41.3 C

BAROMETRIC PRESSURE = 798.0 TORR

TIME	U (M/S)	V (M/S)	W (M/S)	PST-PW (PA)	U/VREF	V/VREF	W/VREF	WT/VREF	IPST-PW/PREF EXPT THEORV	STREAM	SK-FUNC	GT-FUNC
0.0	10.10	0.93	1.00	-32.00	0.170	0.014	0.040	0.275	-0.041 -0.013	0.000	0.000	0.000
20.0	11.97	0.61	2.20	-39.22	0.307	0.016	0.041	0.316	-0.050 -0.012	0.005	0.000	0.000
40.0	12.05	0.34	2.79	-37.70	0.302	0.009	0.074	0.350	-0.040 -0.011	0.020	0.020	0.002
60.0	13.30	0.00	3.30	-26.10	0.350	0.000	0.090	0.307	-0.021 -0.012	0.047	0.071	0.003
80.0	14.07	0.00	3.77	-31.70	0.374	0.000	0.100	0.307	-0.040 -0.011	0.000	0.130	0.002
100.0	14.20	0.00	3.07	-43.00	0.370	0.000	0.103	0.302	-0.050 -0.012	0.130	0.223	0.003
120.0	13.10	0.00	4.20	-32.74	0.340	0.000	0.113	0.300	-0.042 -0.012	0.100	0.323	0.003
140.0	12.74	0.71	4.30	-30.37	0.330	0.010	0.110	0.300	-0.040 -0.012	0.207	0.400	0.032
160.0	11.20	0.30	4.32	-30.70	0.200	0.010	0.110	0.320	-0.047 -0.012	0.340	0.532	0.070
180.0	9.03	0.71	4.10	-32.63	0.250	0.010	0.100	0.270	-0.041 -0.012	0.412	0.622	0.132
200.0	0.70	0.90	4.14	-31.00	0.231	0.010	0.110	0.290	-0.040 -0.012	0.403	0.600	0.190
220.0	7.00	0.00	1.10	-37.03	0.211	0.020	0.030	0.215	-0.047 -0.012	0.504	0.700	0.200
240.0	0.32	1.00	3.04	-24.30	0.100	0.027	0.102	0.100	-0.031 -0.012	0.021	0.020	0.400
260.0	0.43	1.01	3.42	-23.24	-0.144	0.027	0.001	0.173	-0.030 -0.011	0.000	0.000	0.920
280.0	4.03	1.12	3.32	-20.70	0.120	0.030	0.000	0.100	-0.020 -0.011	0.730	0.002	0.052
300.0	3.20	0.00	2.04	-10.00	0.007	0.010	0.070	0.113	-0.020 -0.011	0.704	0.020	0.751
320.0	3.04	0.72	2.72	-10.70	0.007	0.010	0.072	0.122	-0.020 -0.011	0.020	0.044	0.020
340.0	2.00	0.32	1.01	-12.10	0.072	0.000	0.040	0.007	-0.010 -0.011	0.070	0.000	0.044
360.0	2.04	0.12	1.01	-0.02	0.000	0.003	0.040	0.077	-0.013 -0.011	0.000	0.071	0.000
380.0	2.03	0.30	1.33	-0.30	0.070	0.000	0.030	0.003	-0.012 -0.011	0.043	0.002	0.031
400.0	2.40	0.40	0.70	-0.00	0.000	0.012	0.021	0.070	-0.011 -0.011	0.000	0.000	0.070
414.3	0.00	0.00	0.00	-0.00	0.000	0.000	0.000	0.000	0.000 0.000	1.000	1.000	1.000

2T0541

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.209
 SECONDARY MASS FLOW = 0.950
 M-TOTAL = 0.763
 AT TEST SECTION M-TOTAL = 3.420
 M-TOT(TEST SECI)/M-TOT(INLET) = 4.493

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS =	0.0000	0.000
M-BACK AT WALL =	0.0000	0.000
TOTAL M-BACK =	0.0000	0.000

MOMENTUM FLUXES

		DIMENSIONLESS
ANGULAR MOMENTUM FLUX =	0.438 N-m	0.199
AXIAL MOMENTUM FLUX =	20.79 N	1.002
PRESSURE FORCE =	11.149 N	0.000
THRUST =	30.931 N	1.300
SWIRL NUMBER =		0.199
SWIRL NUMBER (W.R.T. THRUST) =		0.163

ENERGY FLUXES

	J/S	DIMENSIONLESS
AXIAL KINETIC ENERGY FLUX =	149.00	0.277
TAN KINETIC ENERGY FLUX =	0.73	0.001
TOTAL KINETIC ENERGY FLUX =	170.82	0.310
PRESSURE ENERGY FLUX =	-00.10	-0.190
TOTAL FLOW ENERGY FLUX =	04.00	0.190

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
 VREF = 37.04 M/S BASED ON THROAT DIAMETER OF 0.0762 M
 REYNOLDS NO. = 0.300E 06

EXPERIMENT NO. 3705H1

PROBE SITE Y

TUNNEL AIR TEMPERATURE = 42.5 C

BAROMETRIC PRESSURE = 756.0 TORR

R (MM)	U (M/S)	V (M/S)	W (M/S)	PST-PW (PA)	U/VREF	V/VREF	W/VREF	WT/VREF	(PST-PW)/PREP		STREAM	OX-FUNC	OT-FUNC
									EXPT	THEORY			
0.0	3.00	0.24	0.28	-16.72	0.002	0.006	0.007	0.003	-0.021	-0.011	0.000	0.000	0.000
20.0	3.00	0.41	0.71	-17.30	0.106	0.011	0.010	0.100	-0.023	-0.011	0.001	0.001	0.000
40.0	3.23	0.41	0.97	-22.02	0.139	0.011	0.020	0.142	-0.020	-0.011	0.007	0.009	0.002
60.0	3.40	0.50	1.20	-22.10	0.194	0.013	0.033	0.190	-0.020	-0.011	0.017	0.013	0.007
80.0	3.64	0.20	1.54	-25.40	0.177	0.008	0.041	0.101	-0.032	-0.011	0.034	0.020	0.019
100.0	3.94	0.12	2.47	-22.32	0.109	0.003	0.066	0.106	-0.020	-0.011	0.050	0.052	0.022
120.0	7.00	0.13	2.12	-22.32	0.200	0.003	0.050	0.207	-0.020	-0.011	0.000	0.003	0.030
140.0	6.30	0.00	2.40	-24.21	0.221	0.000	0.060	0.230	-0.032	-0.011	0.124	0.120	0.039
160.0	6.31	0.00	2.54	-27.21	0.221	0.000	0.000	0.231	-0.039	-0.011	0.170	0.165	0.039
180.0	6.56	0.07	2.71	-29.76	0.220	0.002	0.072	0.230	-0.037	-0.011	0.224	0.202	0.043
200.0	6.11	0.14	2.70	-29.69	0.216	0.004	0.072	0.227	-0.030	-0.011	0.202	0.204	0.017
220.0	7.01	0.13	2.01	-32.13	0.202	0.004	0.075	0.210	-0.020	-0.011	0.343	0.300	0.101
240.0	7.77	0.14	2.74	-29.10	0.207	0.004	0.073	0.210	-0.033	-0.011	0.400	0.470	0.140
260.0	7.73	0.00	2.74	-29.47	0.207	0.000	0.073	0.220	-0.034	-0.011	0.401	0.554	0.102
280.0	6.77	0.00	2.67	-19.07	0.180	0.000	0.071	0.193	-0.023	-0.011	0.554	0.632	0.102
300.0	6.47	0.00	2.50	-16.93	0.172	0.000	0.000	0.185	-0.024	-0.011	0.629	0.702	0.102
320.0	9.04	0.13	2.10	-11.70	0.190	0.003	0.056	0.160	-0.019	-0.011	0.690	0.709	0.100
340.0	9.40	0.10	1.97	-12.93	0.149	0.003	0.052	0.154	-0.010	-0.011	0.703	0.821	0.237
360.0	9.04	0.20	0.00	-11.09	0.134	0.007	0.010	0.139	-0.014	-0.011	0.831	0.874	0.329
380.0	4.00	0.52	1.00	-7.64	0.133	0.014	0.044	0.141	-0.010	-0.011	0.900	0.929	0.927
400.0	5.10	0.47	1.07	-0.20	0.130	0.010	0.044	0.144	-0.010	-0.010	0.973	0.980	0.990
410.3	0.00	0.00	0.00	-0.00	0.000	0.000	0.000	0.000	0.000	0.000	1.000	1.000	1.000

3705 H1

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.103
 SECONDARY MASS FLOW = 0.990
 M-TOTAL = 0.763
 AT TEST SECTION M-TOTAL = 3.767
 M-TOT(1)TEST SEC/M-TOT(INLET) = 0.936

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS	0.0000	0.000
M-BACK AT WALL	0.0000	0.000
TOTAL M-BACK	0.0000	0.000

MOMENTUM FLUXES

		DIMENSIONLESS
ANGULAR MOMENTUM FLUX	0.195 N-M	0.049
AXIAL MOMENTUM FLUX	29.42 N	0.006
PRESSURE FORCE	9.436 N	0.007
THRUST	34.891 N	1.219
SWIRL NUMBER		0.100
SWIRL NUMBER (U.R.T. THRUST)		0.073

ENERGY FLUXES

	J/S	DIMENSIONLESS
AXIAL KINETIC ENERGY FLUX	88.77	0.109
TAN KINETIC ENERGY FLUX	0.13	0.000
TOTAL KINETIC ENERGY FLUX	88.90	0.103
PRESSURE ENERGY FLUX	-89.99	-0.122
TOTAL FLOW ENERGY FLUX	32.97	0.001

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
 VREF = 37.40 M/S BASED ON THROAT DIAMETER OF 0.0762 M
 REYNOLDS NO. = 0.367E 08

WARNING: A PITCH ANGLE OF 88.7 DEG. WAS CALCULATED AT R = 128.0 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF 92.9 DEG. WAS CALCULATED AT R = 148.0 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF 77.9 DEG. WAS CALCULATED AT R = 168.0 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF 88.2 DEG. WAS CALCULATED AT R = 188.0 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF 122.0 DEG. WAS CALCULATED AT R = 208.0 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF 83.1 DEG. WAS CALCULATED AT R = 228.0 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF 109.4 DEG. WAS CALCULATED AT R = 248.0 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF 98.8 DEG. WAS CALCULATED AT R = 268.0 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF 94.0 DEG. WAS CALCULATED AT R = 288.0 MM. THIS POINT HAS BEEN ELIMINATED.

EXPERIMENT NO. 1710M1

PROBE SITE Y

TUNNEL AIR TEMPERATURE = 38.1 C

BAROMETRIC PRESSURE = 750.0 TORR

R (MM)	U (M/S)	V (M/S)	W (M/S)	PST-PP (PA)	U/VREF	W/VREF	V/VREF	WT/VREF	(PST-PP)/PPREF EXPT THEORY	STREAP	ST-PUNC	ST-PU	
0.0	0.00	0.10	1.07	-34.27	0.101	0.000	0.001	0.100	-0.000	-0.000	0.000	0.000	0.000
20.0	0.00	0.20	1.01	-31.07	0.173	0.000	0.000	0.102	-0.001	-0.000	0.010	0.013	0.000
40.0	0.01	0.30	1.04	-30.10	0.100	0.010	0.000	0.200	-0.007	-0.002	0.041	0.000	0.000
60.0	0.00	0.40	1.07	-27.07	0.104	0.010	0.000	0.207	-0.000	-0.000	0.000	0.120	1.011
80.0	0.00	0.70	1.20	-20.00	0.107	0.021	0.114	0.220	-0.000	-0.000	0.100	0.227	0.000
100.0	0.00	0.70	1.01	-20.04	0.170	0.021	0.122	0.212	-0.000	-0.000	0.200	0.340	0.000
300.0	0.00	1.00	0.40	-0.10	0.017	0.000	0.012	0.000	-0.012	0.001	0.000	0.000	0.000
320.0	0.00	1.07	0.17	-7.00	0.014	0.001	0.000	0.000	-0.010	0.001	0.020	0.000	0.700
340.0	0.00	1.02	0.07	-4.00	0.011	0.000	0.010	0.000	-0.000	0.001	0.000	0.000	0.000
360.0	0.10	1.70	0.00	-2.71	0.000	0.007	0.011	0.000	-0.000	0.000	0.000	0.000	0.001
380.0	0.27	1.02	0.00	-1.00	0.007	0.001	0.024	0.000	-0.001	0.000	0.000	0.000	0.001
400.0	0.20	1.47	1.01	1.07	0.000	0.000	0.027	0.000	0.000	0.000	1.000	0.000	0.001
420.0	0.00	0.00	0.00	-0.00	0.000	0.000	0.000	0.000	0.000	0.000	1.000	1.000	1.000

ATA041

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.200
 SECONDARY MASS FLOW = 0.999
 M-TOTAL = 0.701
 AT TEST SECTION M-TOTAL = 0.919
 M-TOT(1/TEST SEC)/M-TOT(1/INLET) = 1.267

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS	0.0000	0.000
M-BACK AT WALL	0.0000	0.000
TOTAL M-BACK	0.0000	0.000

MOMENTUM FLUXES

		DIMENSIONLESS
ANGULAR MOMENTUM FLUX	0.170 N-M	0.003
AXIAL MOMENTUM FLUX	4.00 N	0.104
PRESSURE FORCE	0.372 N	0.190
THRUST	0.000 N	0.392
SWIRL NUMBER		0.900
SWIRL NUMBER (U.R.T. THRUST)		0.230

ENERGY FLUXES

	J/S	DIMENSIONLESS
AXIAL KINETIC ENERGY FLUX	10.94	0.020
TAN KINETIC ENERGY FLUX	0.97	0.001
TOTAL KINETIC ENERGY FLUX	21.44	0.042
PRESSURE ENERGY FLUX	-10.41	-0.030
TOTAL FLOW ENERGY FLUX	2.07	0.004

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
 VPEF = 30.07 M/S BASED ON THROAT DIAMETER OF 0.0702 M
 REYNOLDS NO. = 0.300E 00

WARNING: A PITCH ANGLE OF 89.1 DEG. WAS CALCULATED AT R = 489.9 MM. THIS POINT HAS BEEN ELIMINATED.

EXPERIMENT NO. 2710H1

PROBE SITE Y

TUNNEL AIR TEMPERATURE = 35.3 C

BAROMETRIC PRESSURE = 753.0 TORR

R (MM)	U (M/S)	V (M/S)	W (M/S)	PST-PO (PA)	U/VREF	V/VREF	W/VREF	WT/VREF	(PST-PO)/PREP EXPT THEORY	STREAM	OR-FUNC	OT-FI
5.0	0.00	0.00	0.00	-0.00	0.000	0.000	0.000	0.000	-0.010 -0.000	0.000	0.000	0.000
20.0	0.00	0.00	0.00	-0.33	0.000	0.000	0.000	0.000	-0.012 -0.000	0.000	0.000	0.000
40.0	0.00	0.00	0.00	-7.07	0.000	0.000	0.000	0.000	-0.009 -0.000	0.000	0.000	0.000
60.0	0.00	0.30	-0.01	-10.07	0.023	0.000	-0.000	0.015	-0.014 -0.000	0.073	0.002	0.070
80.0	1.00	0.30	0.10	-10.32	0.020	0.010	0.003	0.020	-0.013 -0.000	0.204	0.201	0.301
100.0	1.12	0.00	0.10	-9.70	0.020	0.002	0.003	0.030	-0.013 -0.000	0.530	0.501	0.020
120.0	0.00	0.10	0.00	-8.70	0.024	0.000	0.002	0.015	-0.011 -0.000	0.040	0.002	0.000
140.0	0.00	0.00	0.00	-9.32	0.000	0.000	0.000	0.000	-0.012 -0.000	1.000	1.000	1.000
160.0	0.00	0.00	0.00	-9.67	0.000	0.000	0.000	0.000	-0.012 -0.000	1.000	1.000	1.000
180.0	0.00	0.00	0.00	-9.32	0.000	0.000	0.000	0.000	-0.012 -0.000	1.000	1.000	1.000
200.0	0.00	0.00	0.00	-10.00	0.000	0.000	0.000	0.000	-0.013 -0.000	1.000	1.000	1.000
220.0	0.00	0.00	0.00	-10.00	0.000	0.000	0.000	0.000	-0.013 -0.000	1.000	1.000	1.000
240.0	0.00	0.00	0.00	-10.00	0.000	0.000	0.000	0.000	-0.013 -0.000	1.000	1.000	1.000
260.0	0.00	0.00	0.00	-9.67	0.000	0.000	0.000	0.000	-0.009 -0.000	1.000	1.000	1.000
280.0	0.00	0.00	0.00	-7.32	0.000	0.000	0.000	0.000	-0.009 -0.000	1.000	1.000	1.000
300.0	0.00	0.00	0.00	-8.00	0.000	0.000	0.000	0.000	-0.011 -0.000	1.000	1.000	1.000
320.0	0.00	0.00	0.00	-7.07	0.000	0.000	0.000	0.000	-0.009 -0.000	1.000	1.000	1.000
340.0	0.00	0.00	0.00	-6.13	0.000	0.000	0.000	0.000	-0.000 -0.000	1.000	1.000	1.000
360.0	0.00	0.00	0.00	-7.07	0.000	0.000	0.000	0.000	-0.000 -0.000	1.000	1.000	1.000
380.0	0.00	0.00	0.00	-5.07	0.000	0.000	0.000	0.000	-0.000 -0.000	1.000	1.000	1.000
410.3	0.00	0.00	0.00	-0.00	0.000	0.000	0.000	0.000	0.000 0.000	1.000	1.000	1.000

2T 1041

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.209
 SECONDARY MASS FLOW = 0.999
 M-TOTAL = 0.704
 AT TEST SECTION M-TOTAL = 0.095
 M-TOT(1/TEST SECT)/M-TOT(1/INLET) = 0.067

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS = 0.0000	0.000	0.000
M-BACK AT WALL = 0.0000	0.000	0.000
TOTAL M-BACK = 0.0000	0.000	0.000

MOMENTUM FLUXES

		DIMENSIONLESS
ANGULAR MOMENTUM FLUX = 0.001 N-M	0.001	0.000
AXIAL MOMENTUM FLUX = 0.05 N	0.002	0.002
PRESSURE FORCE = 3.000 N	2.093	2.093
THRUST = 3.007 N	0.130	0.130
SWIRL NUMBER =	0.226	0.226
SWIRL NUMBER (W.R.T. THRUST) =	0.003	0.003

ENERGY FLUXES

	J/S	DIMENSIONLESS
AXIAL KINETIC ENERGY FLUX = 0.03	0.000	0.000
TAN KINETIC ENERGY FLUX = 0.00	0.000	0.000
TOTAL KINETIC ENERGY FLUX = 0.03	0.000	0.000
PRESSURE ENERGY FLUX = -0.44	-0.001	-0.001
TOTAL FLOW ENERGY FLUX = -0.41	-0.001	-0.001

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
 VREF = 30.93 M/S BASED ON THROAT DIAMETER OF 0.0702 M
 REYNOLDS NO. = 0.300E 00

EXPERIMENT NO. 3710H1

PROBE SIZE Y

TUNNEL AIR TEMPERATURE = 39.8 C

BAROMETRIC PRESSURE = 756.0 TORR

Q (MM)	U (M/S)	V (M/S)	W (M/S)	PST-PU (PA)	U/VREF	V/VREF	W/VREF	WT/VREF	(PST-PU)/PREP EXPT THEORY	STREAN	ST-FUNC	ST-FUN
0.0	0.00	0.00	0.00	-3.17	0.000	0.000	0.000	0.000	-0.005 -0.004	0.000	0.000	0.000
20.0	0.00	0.00	0.00	-3.33	0.000	0.000	0.000	0.000	-0.007 -0.004	0.000	0.000	0.000
40.0	0.00	0.00	0.00	-4.40	0.000	0.000	0.000	0.000	-0.008 -0.004	0.000	0.000	0.000
60.0	0.00	0.00	0.00	-5.33	0.000	0.000	0.000	0.000	-0.007 -0.004	0.000	0.000	0.000
80.0	0.00	0.00	0.00	-4.93	0.000	0.000	0.000	0.000	-0.008 -0.004	0.000	0.000	0.000
100.0	0.00	0.00	0.00	-5.33	0.000	0.000	0.000	0.000	-0.007 -0.004	0.000	0.000	0.000
120.0	0.00	0.00	0.00	-5.20	0.000	0.000	0.000	0.000	-0.007 -0.004	0.000	0.000	0.000
140.0	0.00	0.00	0.00	-4.00	0.000	0.000	0.000	0.000	-0.005 -0.004	0.000	0.000	0.000
160.0	0.00	0.00	0.00	-5.33	0.000	0.000	0.000	0.000	-0.007 -0.004	0.000	0.000	0.000
180.0	0.00	0.00	0.00	-5.33	0.000	0.000	0.000	0.000	-0.007 -0.004	0.000	0.000	0.000
200.0	2.38	4.12	0.04	-4.14	0.005	0.112	0.023	0.131	-0.005 -0.003	0.271	0.273	0.275
400.0	2.23	3.76	1.20	-1.30	0.000	0.103	0.032	0.123	-0.002 -0.002	0.380	0.318	0.413
614.3	0.00	0.00	0.00	-0.00	0.000	0.000	0.000	0.000	0.000 0.000	1.000	1.000	1.000

3TA0H1

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.285
 SECONDARY MASS FLOW = 0.955
 M-TOTAL = 0.780
 AT TEST SECTION M-TOTAL = 0.237
 M-TOT(1/TEST SEC)/M-TOT(INLET) = 0.312

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS = 0.0000	0.000	
M-BACK AT WALL = 0.0000	0.000	
TOTAL M-BACK = 0.0000	0.000	

MOMENTUM FLUXES

	KG/S	DIMENSIONLESS
ANGULAR MOMENTUM FLUX = 0.388 N-M	0.171	
AXIAL MOMENTUM FLUX = 0.55 N	0.020	
PRESSURE FORCE = 2.450 N	0.280	
THRUST = 2.880 N	0.187	
SWIRL NUMBER =	0.750	
SWIRL NUMBER (V.M.T. THRUST) =	1.801	

ENERGY FLUXES

	J/S	DIMENSIONLESS
AXIAL KINETIC ENERGY FLUX = 0.53	0.001	
TAN KINETIC ENERGY FLUX = 1.87	0.004	
TOTAL KINETIC ENERGY FLUX = 2.43	0.009	
PRESSURE ENERGY FLUX = -0.88	-0.001	
TOTAL FLOW ENERGY FLUX = 2.55	0.004	

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.80 PA
 VREF = 32.80 M/S BASED ON THROAT DIAMETER OF 0.0782 M
 REYNOLDS NO. = 0.388E 00

WARNING: A PITCH ANGLE OF -130.3 DEG. WAS CALCULATED AT R = 300.0 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF -91.3 DEG. WAS CALCULATED AT R = 320.0 MM. THIS POINT HAS BEEN ELIMINATED.

EXPERIMENT NO. 1720H1

PROBE SITE 7

TUNNEL AIR TEMPERATURE = 30.1 C

BAROMETRIC PRESSURE = 754.0 TORR

R (MM)	U (M/S)	V (M/S)	W (M/S)	PST-PW (PA)	U/VREF	V/VREF	W/VREF	WT/VREF	(PST-PW)/PREF EXPT THEORY	STREAM	OX-FUNC	OT-FUNC
0.0	-2.21	1.10	-0.02	-22.20	-0.000	0.032	-0.001	0.000	-0.020 -0.035	0.000	0.000	0.000
20.0	-1.40	1.40	0.03	-20.30	-0.040	0.040	0.001	0.003	-0.023 -0.034	-0.000	0.001	-0.000
40.0	-0.80	1.20	-0.74	-20.53	-0.010	0.034	-0.020	0.004	-0.032 -0.032	-0.010	0.003	-0.002
60.0	0.00	1.00	-1.30	-23.07	0.000	0.031	-0.030	0.013	-0.031 -0.030	-0.010	0.004	-0.002
80.0	1.10	3.27	-1.34	-23.02	0.032	0.030	-0.030	0.101	-0.031 -0.027	-0.000	0.000	0.000
100.0	2.40	0.10	-0.07	-22.53	0.067	0.110	-0.020	0.130	-0.031 -0.023	0.040	0.021	0.004
120.0	2.02	0.00	-0.00	-21.50	0.104	0.123	-0.010	0.102	-0.020 -0.010	0.100	0.070	0.210
140.0	0.07	0.00	-0.20	-23.07	0.124	0.120	-0.007	0.174	-0.030 -0.013	0.217	0.100	0.002
160.0	0.00	0.10	0.24	-19.44	0.133	0.111	0.007	0.173	-0.024 -0.000	0.031	0.000	0.001
180.0	0.73	3.00	0.03	-10.20	0.120	0.007	0.014	0.101	-0.021 -0.007	0.777	0.073	1.002
200.0	0.10	2.04	0.70	-10.53	0.111	0.077	0.021	0.137	-0.010 -0.000	1.020	0.120	1.003
220.0	3.10	2.24	3.01	-10.20	0.000	0.001	0.020	0.110	-0.010 -0.004	1.200	0.700	2.102
240.0	2.12	1.02	0.70	-11.21	0.007	0.004	0.020	0.070	-0.010 -0.004	1.447	0.020	2.403
260.0	1.10	1.07	0.00	-7.62	0.031	0.020	0.010	0.040	-0.010 -0.004	1.000	0.000	2.020
280.0	0.00	0.00	-0.10	-0.17	0.010	0.010	-0.004	0.024	-0.011 -0.000	1.037	0.000	2.070
300.0	-1.02	1.00	-0.31	-3.30	-0.020	0.040	-0.000	0.004	-0.007 -0.000	1.000	0.000	2.000
320.0	-1.01	1.20	-0.00	-4.32	-0.020	0.001	-0.010	0.074	-0.000 -0.000	1.000	0.000	2.000
340.0	-1.00	2.00	-0.01	-3.00	-0.040	0.000	-0.000	0.000	-0.000 -0.000	1.200	0.000	2.000
400.0	-1.47	2.23	0.24	-1.00	-0.040	0.000	0.000	0.070	-0.000 -0.000	1.000	0.000	1.000
420.0	0.00	0.00	0.00	-0.00	0.000	0.000	0.000	0.000	0.000 0.000	1.000	1.000	1.000

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.296
 SECONDARY MASS FLOW = 0.932
 M-TOTAL = 0.782
 AT TEST SECTION M-TOTAL = 0.672
 M-TOT/TEST SECT/M-TOT(INLET) = 0.821

1T 20H1

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS = 0.0091	0.0091	0.012
M-BACK AT WALL = 0.3337	0.3337	0.708
TOTAL M-BACK = 0.3428	0.3428	0.723

MOMENTUM FLUXES

	KG/S	DIMENSIONLESS
ANGULAR MOMENTUM FLUX = 0.193 N-M	0.193	0.079
AXIAL MOMENTUM FLUX = 3.48 N	3.48	0.121
PRESSURE FORCE = 9.219 N	9.219	0.299
THRUST = 0.823 N	0.823	0.307
SUSSL NUMBER =		0.630
SUSSL NUMBER (V.P.T. THRUST) =		0.249

ENERGY FLUXES

	J/S	DIMENSIONLESS
AXIAL KINETIC ENERGY FLUX = 9.83	9.83	0.011
TAN KINETIC ENERGY FLUX = 3.75	3.75	0.007
TOTAL KINETIC ENERGY FLUX = 9.93	9.93	0.018
PRESSURE ENERGY FLUX = -18.98	-18.98	-0.020
TOTAL FLOW ENERGY FLUX = -9.97	-9.97	-0.002

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
 VREF = 38.98 M/S BASED ON THROAT DIAMETER OF 0.0782 M
 REYNOLDS NO. = 0.3482 98

FOR INTEGRATION.

WARNING: A PITCH ANGLE OF -197.6 DEG. WAS CALCULATED AT R = 30.0 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF -99.4 DEG. WAS CALCULATED AT W = 40.8 MP. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF -47.1 DEG. WAS CALCULATED AT R = 80.8 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF -94.4 DEG. WAS CALCULATED AT R = 88.0 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF -47.8 DEG. WAS CALCULATED AT R = 100.0 NM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF -122.0 DEG. WAS CALCULATED AT R = 120.0 NM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF -88.3 DEG. WAS CALCULATED AT R = 140.0 NM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF -111.9 DEG. WAS CALCULATED AT R = 100.0 MM. THIS POINT HAS BEEN ELIMINATED.

EXPERIMENT NO. 2720H1

PROBE SITE T

TUNNEL AIR TEMPERATURE = 49.3 C

BAROMETRIC PRESSURE = 799.3 TORR

Q (MM)	U (M/S)	V (M/S)	W (M/S)	PST-PV (PA)	U/VREF	V/VREF	W/VREF	WT/VREF	(PST-PV)/PREP EXPT THEORY	STREAP	OX-FUNC	ST-FUNC
0.0	0.34	0.00	0.00	-7.10	0.000	0.000	0.000	0.000	-0.000 -0.000	0.000	0.000	0.000
100.0	0.34	1.24	-0.02	-7.10	0.000	0.003	-0.022	0.041	-0.000 -0.000	0.112	0.000	0.000
200.0	0.34	1.77	-0.41	-7.00	0.010	0.040	-0.011	0.001	-0.010 -0.004	0.140	0.000	0.000
320.0	0.70	1.70	-0.20	-6.41	0.010	0.040	-0.007	0.002	-0.011 -0.000	0.100	0.107	0.000
440.0	0.61	1.71	-0.20	-7.14	0.010	0.040	-0.000	0.040	-0.000 -0.000	0.200	0.100	0.100
560.0	0.00	1.00	0.10	-7.00	0.020	0.000	0.000	0.000	-0.000 -0.000	0.300	0.200	0.100
680.0	0.70	1.70	0.17	-9.00	0.010	0.040	0.000	0.001	-0.000 -0.000	0.400	0.300	0.200
800.0	0.00	2.11	0.10	-9.00	0.010	0.000	0.000	0.000	-0.000 -0.000	0.400	0.400	0.200
920.0	0.70	2.00	0.20	-9.70	0.020	0.000	0.000	0.001	-0.000 -0.000	0.000	0.000	0.000
1040.0	0.00	2.70	0.00	-2.00	0.010	0.000	0.000	0.000	-0.000 -0.000	0.000	0.000	0.000
1160.0	0.00	2.00	0.20	-3.00	0.010	0.000	0.000	0.000	-0.000 -0.000	0.000	0.000	0.000
1280.0	0.00	2.70	0.20	-1.00	0.010	0.000	0.000	0.000	-0.000 -0.000	0.000	0.000	0.000
1400.0	0.70	2.00	0.00	0.00	0.020	0.000	0.000	0.000	0.000 0.000	0.000	0.000	0.000
1520.0	0.00	0.00	0.00	-0.00	0.000	0.000	0.000	0.000	0.000 0.000	1.000	1.000	1.000

2T 20H1

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.284
 SECONDARY MASS FLOW = 0.948
 M-TOTAL = 0.753
 AT TEST SECTION M-TOTAL = 0.347
 M-TOT(TEST SEC) / M-TOT(INLET) = 0.461

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS =	0.0000	0.000
M-BACK AT WALL =	0.0000	0.000
TOTAL M-BACK =	0.0000	0.000

MOMENTUM FLUXES

		DIMENSIONLESS
ANGULAR MOMENTUM FLUX =	0.230 N-M	0.100
AXIAL MOMENTUM FLUX =	0.22 N	0.000
PRESSURE FORCE =	2.003 N	0.200
THRUST =	2.007 N	0.103
SWIRL NUMBER =		13.934
SWIRL NUMBER (U.R.T. THRUST) =		1.040

ENERGY FLUXES

	J/S	DIMENSIONLESS
AXIAL KINETIC ENERGY FLUX =	0.04	0.000
TAN KINETIC ENERGY FLUX =	0.03	0.002
TOTAL KINETIC ENERGY FLUX =	0.04	0.002
PRESSURE ENERGY FLUX =	-1.03	-0.003
TOTAL FLOW ENERGY FLUX =	-0.00	-0.001

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
 VREF = 37.23 M/S BASED ON THROAT DIAMETER OF 0.0762 M
 REYNOLDS NO. = 0.303E 00

WARNING: A PITCH ANGLE OF 48.5 DEG. WAS CALCULATED ON THE AXIS. ITS DATA HAS BEEN ALTERED FOR INTEGRATION.

WARNING: A PITCH ANGLE OF 55.5 DEG. WAS CALCULATED AT R = 20.0 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF 74.5 DEG. WAS CALCULATED AT R = 80.0 MM. THIS POINT HAS BEEN ELIMINATED.

EXPERIMENT NO. 3Y20H1

PROBE SITE Y

TUNNEL AIR TEMPERATURE = 44.8 C

BAROMETRIC PRESSURE = 753.2 TORR

R (MM)	U (M/S)	V (M/S)	W (M/S)	PST-PV (PA)	U/VREF	V/VREF	W/VREF	WT/VREF	(PST-PV)/PREF EXPT THEORY	STREAM	OX-FUNC	ST-FUNC
0.0	-1.03	0.00	0.00	-11.20	-0.027	0.000	0.000	-0.027	-0.014 -0.013	0.000	0.000	0.000
100.0	-1.03	0.05	0.30	-11.20	-0.027	0.017	0.020	0.041	-0.014 -0.013	-0.090	0.033	-0.003
120.0	-0.81	0.75	0.72	-10.43	-0.018	0.020	0.019	0.032	-0.013 -0.013	-0.120	0.042	-0.009
140.0	-1.02	1.12	0.82	-11.35	-0.027	0.029	0.016	0.043	-0.014 -0.012	-0.150	0.004	-0.007
160.0	-1.13	1.70	0.94	-12.43	-0.031	0.040	0.014	0.050	-0.016 -0.012	-0.210	0.077	-0.019
180.0	-0.91	1.90	0.71	-10.98	-0.024	0.052	0.010	0.061	-0.013 -0.012	-0.277	0.099	-0.028
200.0	-0.39	1.49	0.92	-9.58	-0.010	0.038	0.014	0.043	-0.012 -0.011	-0.310	0.110	-0.033
320.0	-0.23	1.90	0.94	-9.81	-0.008	0.050	0.014	0.052	-0.012 -0.011	-0.341	0.113	-0.030
240.0	-0.00	2.41	0.93	-9.72	-0.002	0.084	0.014	0.065	-0.012 -0.010	-0.393	0.114	-0.041
260.0	0.14	2.00	0.37	-9.88	0.004	0.071	0.010	0.072	-0.011 -0.000	-0.390	0.114	-0.040
280.0	0.74	3.19	0.20	-8.38	0.020	0.084	0.001	0.087	-0.011 -0.000	-0.300	0.124	-0.010
300.0	1.00	3.10	0.30	-8.11	0.028	0.093	0.001	0.090	-0.000 -0.000	-0.220	0.191	0.026
320.0	1.34	3.48	0.49	-4.33	0.055	0.092	0.012	0.090	-0.000 -0.007	-0.094	0.209	0.100
340.0	1.04	3.72	0.30	-3.40	0.043	0.090	0.010	0.100	-0.004 -0.000	0.077	0.208	0.219
360.0	1.93	4.10	0.09	-2.10	0.091	0.111	0.010	0.123	-0.003 -0.004	0.294	0.439	0.380
380.0	2.41	4.17	0.19	-4.14	0.094	0.110	0.020	0.120	-0.000 -0.003	0.574	0.492	0.620
400.0	2.20	3.93	1.21	-1.30	0.080	0.101	0.038	0.132	-0.002 -0.002	0.900	0.911	0.904
410.2	0.07	0.00	0.00	-0.00	0.000	0.000	0.000	0.000	0.000 0.000	1.000	1.000	1.000

3T.2041

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.389
 SECONDARY MASS FLOW = 0.997
 M-TOTAL = 0.763
 AT TEST SECTION M-TOTAL = 0.481
 M-TOT(TEST SEC) / M-TOT(INLET) = 0.629

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS	0.1429	0.317
M-BACK AT WALL	0.0000	0.000
TOTAL M-BACK	0.1429	0.397

MOMENTUM FLUXES

	KG/S	DIMENSIONLESS
ANGULAR MOMENTUM FLUX	0.714 N-M	0.324
AREAL MOMENTUM FLUX	1.13 N	0.639
PRESSURE FORCE	3.989 N	0.239
THRUST	4.786 N	0.163
SWIRL NUMBER		0.282
SWIRL NUMBER (W.R.T. THRUST)		1.993

ENERGY FLUXES

	J/S	DIMENSIONLESS
AREAL KINETIC ENERGY FLUX	0.94	0.002
TAN KINETIC ENERGY FLUX	3.87	0.007
TOTAL KINETIC ENERGY FLUX	4.83	0.009
PRESSURE ENERGY FLUX	3.91	0.008
TOTAL FLOW ENERGY FLUX	7.99	0.019

MISCELLANEOUS DATA

PRESSURE AT WALL = 9.26 PA
 VREF = 37.89 M/S BASED ON THROAT DIAMETER OF 0.0762 M
 REYNOLDS NO. = 0.390E 06

EXPERIMENT NO. 173041

PAGE SIX Y

TUNNEL AIR TEMPERATURE = 34.9 C

BARGOMETRIC PRESSURE = 754.0 TORR

(MM)	U (M/S)	U (M/S)	V (M/S)	PST-PU (PA)	U/VREF	U/VREF	V/VREF	VT/VREF	(PST-PU)/PREP EXPT	THEORY	STREAP	GE-FUNC	GT-FUNC
0.0	-4.40	2.64	-1.43	-45.16	-0.129	0.079	-0.039	0.140	-0.003	-0.002	0.000	0.000	0.000
20.0	-3.32	3.44	-2.12	-47.55	-0.091	0.094	-0.003	0.143	-0.002	-0.003	-0.007	0.002	-0.001
40.0	-2.00	3.01	-2.27	-49.00	-0.059	0.104	-0.002	0.133	-0.004	-0.000	-0.023	0.007	-0.004
60.0	-0.94	4.20	-2.49	-47.22	-0.010	0.110	-0.070	0.141	-0.002	-0.009	-0.039	0.000	-0.000
80.0	0.02	4.40	-3.23	-41.04	0.012	0.120	-0.000	0.150	-0.004	-0.001	-0.039	0.000	-0.007
100.0	1.70	9.09	-3.26	-37.71	0.047	0.130	-0.000	0.172	-0.040	-0.043	-0.013	0.012	0.011
120.0	3.90	9.00	-2.44	-39.33	0.100	0.199	-0.007	0.200	-0.001	-0.030	0.000	0.030	0.000
140.0	9.19	9.02	-2.03	-39.00	0.141	0.194	-0.004	0.210	-0.040	-0.020	0.102	0.000	0.204
160.0	0.14	9.17	-1.40	-31.12	0.100	0.141	-0.041	0.223	-0.041	-0.022	0.303	0.202	0.912
180.0	0.01	9.00	-0.97	-31.01	0.100	0.137	-0.010	0.232	-0.042	-0.010	0.907	0.300	0.000
200.0	0.17	4.23	-0.10	-29.10	0.171	0.110	-0.004	0.207	-0.033	-0.014	0.000	0.934	1.273
220.0	9.24	3.47	0.49	-21.70	0.143	0.099	0.014	0.172	-0.029	-0.012	1.119	0.004	1.009
240.0	4.24	3.14	1.11	-23.49	0.110	0.000	0.030	0.147	-0.031	-0.011	1.340	0.700	1.942
260.0	2.39	2.10	0.76	-17.21	0.004	0.097	0.021	0.000	-0.023	-0.010	1.017	0.000	2.107
280.0	0.00	1.00	0.14	-14.90	0.022	0.037	0.004	0.043	-0.010	-0.010	1.000	0.070	2.229
300.0	-0.00	1.90	-0.94	-19.30	-0.002	0.040	-0.019	0.040	-0.020	-0.000	1.020	0.070	2.240
320.0	-0.00	2.17	-0.31	-13.99	-0.017	0.099	-0.000	0.002	-0.010	-0.000	1.000	0.070	2.212
340.0	-1.39	2.07	-0.90	-7.70	-0.030	0.073	-0.010	0.004	-0.010	-0.000	1.004	0.000	2.100
360.0	-2.03	3.00	-0.90	-7.04	-0.000	0.004	-0.010	0.102	-0.010	-0.000	1.000	0.011	1.070
380.0	-2.35	3.40	-0.29	-0.20	-0.004	0.000	-0.007	0.119	-0.007	-0.007	1.204	0.000	1.907
400.0	-1.02	2.93	0.31	-4.00	-0.002	0.000	0.000	0.000	-0.000	-0.000	1.000	0.000	1.120
010.0	0.00	0.00	0.00	-0.00	0.000	0.000	0.000	0.000	0.000	0.000	1.000	1.000	1.000

AT 30 HA

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.286
 SECONDARY MASS FLOW = 0.937
 M-TOTAL = 0.782
 AT TEST SECTION M-TOTAL = 0.676
 M-TOT(TEST SEC) / M-TOT(INLET) = 0.869

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS = 0.0259	0.0259	0.033
M-BACK AT WALL = 0.4269	0.4269	0.036
TOTAL M-BACK = 0.4927	0.4927	0.069

MOMENTUM FLUXES

	KG/M	DIMENSIONLESS
ANGULAR MOMENTUM FLUX = 0.385 N-M	0.385	0.191
AXIAL MOMENTUM FLUX = 6.83 N	6.83	0.236
PRESSURE FORCE = 0.435 N	0.435	0.381
THRUST = 16.884 N	16.884	0.978
SWIRL NUMBER =		0.782
SWIRL NUMBER (W.R.T. THRUST) =		0.319

ENERGY FLUXES

	J/S	DIMENSIONLESS
AXIAL KINETIC ENERGY FLUX = 19.18	19.18	0.639
TAN KINETIC ENERGY FLUX = 0.98	0.98	0.017
TOTAL KINETIC ENERGY FLUX = 24.99	24.99	0.046
PRESSURE ENERGY FLUX = -23.93	-23.93	-0.946
TOTAL FLOW ENERGY FLUX = 1.02	1.02	0.002

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.88 PA
 VREF = 39.97 M/S BASED ON THROAT DIAMETER OF 0.0762 M
 REYNOLDS NO. = 0.377E 06

WARNING: A PITCH ANGLE OF -70.1 DEG. WAS CALCULATED ON THE AXIS. ITS DATA HAS BEEN ALTERED FOR INTEGRATION.

WARNING: A PITCH ANGLE OF -82.4 DEG. WAS CALCULATED AT R = 40.0 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF -49.3 DEG. WAS CALCULATED AT R = 80.0 MM. THIS POINT HAS BEEN ELIMINATED.

EXPERIMENT NO. 2730H2

PROBE SITE Y

TUNNEL AIR TEMPERATURE = 35.3 C

BAROMETRIC PRESSURE = 756.6 TORR

R (MM)	U (M/S)	V (M/S)	W (M/S)	PSY-PV (PA)	U/VREF	U/VREF	V/VREF	W/VREF	IPSY-PI/PREF EXPT THEORY	STREAM	OX-FUNC	GY-FUN
0.0	0.00	0.00	0.00	-38.25	0.000	0.000	0.000	0.000	-0.047 -0.027	0.000	0.000	0.000
20.0	0.00	0.00	0.00	-38.25	0.000	0.000	0.000	0.000	-0.047 -0.027	0.000	0.000	0.000
40.0	-1.45	1.41	-1.38	-32.89	-0.045	0.044	-0.037	0.073	-0.043 -0.025	-0.004	0.003	-0.000
100.0	-1.40	2.30	-1.27	-27.91	-0.041	0.053	-0.039	0.082	-0.038 -0.024	-0.104	0.009	-0.013
150.0	-1.30	2.44	-1.13	-24.99	-0.039	0.067	-0.031	0.081	-0.032 -0.023	-0.200	0.123	-0.023
160.0	-1.16	2.71	-0.88	-23.77	-0.032	0.074	-0.024	0.084	-0.031 -0.021	-0.270	0.199	-0.030
180.0	-1.01	2.91	-0.39	-22.06	-0.027	0.079	-0.011	0.099	-0.029 -0.020	-0.340	0.164	-0.093
190.0	-0.92	2.63	-0.20	-19.68	-0.014	0.072	-0.003	0.073	-0.029 -0.019	-0.399	0.201	-0.066
200.0	-0.41	2.89	-0.23	-18.99	-0.011	0.070	-0.000	0.090	-0.021 -0.017	-0.436	0.200	-0.079
210.0	0.19	2.93	-0.06	-19.23	0.004	0.069	-0.002	0.089	-0.020 -0.010	-0.440	0.211	-0.062
240.0	0.24	3.00	0.10	-19.93	0.007	0.061	0.009	0.082	-0.020 -0.019	-0.410	0.212	-0.079
260.0	0.03	3.37	0.30	-16.70	0.019	0.092	0.000	0.093	-0.019 -0.014	-0.303	0.220	-0.094
280.0	0.70	3.20	0.97	-12.81	0.021	0.080	0.010	0.093	-0.010 -0.013	-0.387	0.240	-0.014
300.0	0.07	3.40	0.02	-11.10	0.020	0.099	0.017	0.090	-0.010 -0.012	-0.209	0.272	0.040
320.0	1.07	3.01	0.02	-10.10	0.020	0.090	0.017	0.104	-0.013 -0.010	-0.077	0.320	0.127
340.0	1.32	3.72	0.00	-9.73	0.038	0.101	0.010	0.109	-0.011 -0.009	0.000	0.399	0.140
360.0	1.04	3.80	0.90	-9.82	0.040	0.090	0.019	0.109	-0.000 -0.000	0.311	0.929	0.412
380.0	1.03	3.89	0.91	-8.03	0.090	0.109	0.017	0.117	-0.004 -0.007	0.909	0.700	0.933
400.0	1.04	3.89	0.91	-6.64	0.090	0.109	0.019	0.110	-0.000 -0.000	0.909	0.922	0.900
414.3	0.00	0.00	0.00	-9.00	0.000	0.000	0.000	0.000	0.000 0.000	1.000	1.000	1.000

MASS FLOWRATES IN N/S

PRIMARY MASS FLOW = 0.266
 SECONDARY MASS FLOW = 0.950
 M-TOTAL = 0.786
 AT TEST SECTION M-TOTAL = 0.337
 M-TOT(TEST SEC)/TOT(INLET) = 0.442

2T30H2

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS = 0.1929	0.493	
M-BACK AT WALL = 0.0909	0.000	
TOTAL M-BACK = 0.1929	0.493	

MOMENTUM FLUXES

	KG/S	DIMENSIONLESS
ANGULAR MOMENTUM FLUX = 0.977 N-M	0.270	
AXIAL MOMENTUM FLUX = 0.00 N	0.031	
PRESSURE FORCE = 0.020 N	0.950	
THRUST = 7.000 N	0.270	
SWIRL NUMBER =	0.000	
SWIRL NUMBER (W.R.T. THRUST) =	0.070	

ENERGY FLUXES

	J/S	DIMENSIONLESS
AXIAL KINETIC ENERGY FLUX =	0.02	0.001
TAN KINETIC ENERGY FLUX =	3.03	0.000
TOTAL KINETIC ENERGY FLUX =	3.20	0.000
PRESSURE ENERGY FLUX =	0.20	0.001
TOTAL FLOW ENERGY FLUX =	3.55	0.007

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
 VREF = 30.72 M/S BASED ON THROAT DIAMETER OF 0.0702 M
 REYNOLDS NO. = 0.3704 00

WARNING: A PITCH ANGLE OF 49.6 DEG. WAS CALCULATED AT R = 88.8 MM. THIS POINT HAS BEEN ELIMINATED.

EXPERIMENT NO. 373041

PAGE SITE T

TUNNEL AIR TEMPERATURE = 44.0 C

BARTHOMETRIC PRESSURE = 753.2 TORR

U (M)	U (M/S)	V (M/S)	V (M/S)	PST-Pd (PA)	U/VREF	V/VREF	V/VREF	VT/VREF	IPST-PH/PREF EXPT	THEORY	STREAM	EX-FUNC	GT-FUNC
0.0	-0.42	1.77	1.20	-28.93	-0.011	0.047	0.032	0.033	-0.037	-0.038	0.000	0.000	0.000
20.0	-0.58	1.91	1.30	-32.72	-0.010	0.040	0.035	0.036	-0.042	-0.034	-0.003	0.000	-0.000
100.0	-1.56	2.34	0.90	-33.94	-0.042	0.002	0.024	0.070	-0.043	-0.029	-0.143	0.002	-0.013
120.0	-1.57	2.08	0.79	-21.46	-0.042	0.077	0.020	0.091	-0.027	-0.023	-0.214	0.079	-0.022
140.0	-1.40	3.16	0.79	-20.22	-0.039	0.004	0.020	0.054	-0.026	-0.021	-0.299	0.101	-0.039
160.0	-1.23	2.07	0.95	-20.55	-0.033	0.076	0.019	0.097	-0.028	-0.019	-0.377	0.139	-0.091
180.0	-1.04	2.94	0.44	-18.03	-0.027	0.076	0.012	0.031	-0.021	-0.010	-0.496	0.190	-0.067
200.0	-0.74	2.08	0.27	-14.33	-0.020	0.079	0.007	0.002	-0.010	-0.017	-0.524	0.171	-0.043
220.0	-0.55	3.11	0.10	-13.90	-0.016	0.005	0.000	0.007	-0.020	-0.010	-0.501	0.102	-0.100
240.0	-0.30	3.97	0.32	-15.16	-0.010	0.005	0.000	0.019	-0.010	-0.014	-0.639	0.100	-0.115
260.0	0.00	3.77	0.34	-12.17	0.000	0.100	0.000	0.101	-0.010	-0.012	-0.894	0.191	-0.122
280.0	0.39	3.09	0.39	-11.27	0.000	0.100	0.000	0.100	-0.014	-0.011	-0.836	0.102	-0.113
300.0	1.11	3.00	0.17	-7.62	0.030	0.000	0.004	0.103	-0.000	-0.000	-0.946	0.212	-0.072
320.0	1.30	4.27	0.93	-0.17	0.007	0.113	0.016	0.120	-0.012	-0.000	-0.346	0.202	0.012
340.0	1.70	4.00	0.40	-7.21	0.047	0.130	0.012	0.130	-0.000	-0.000	-0.170	0.340	0.131
360.0	2.03	4.91	0.07	-3.63	0.004	0.130	0.010	0.142	-0.007	-0.004	0.104	0.479	0.346
380.0	2.40	4.40	0.02	-0.00	0.000	0.110	0.020	0.130	-0.000	-0.002	0.440	0.000	0.900
400.0	2.94	4.40	1.30	-0.49	0.007	0.117	0.039	0.139	-0.001	-0.001	0.001	0.000	0.000
420.3	0.00	0.00	0.00	-0.00	0.000	0.000	0.000	0.000	0.000	0.000	1.000	1.000	1.000

3T30HA

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.205
 SECONDARY MASS FLOW = 0.993
 M-TOTAL = 0.798
 AT TEST SECTION M-TOTAL = 0.338
 M-TOT(TEST SECT)/M-TOT(INLET) = 0.446

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS = 0.2211	0.2211	0.094
M-BACK AT WALL = 0.0000	0.0000	0.000
TOTAL M-BACK = 0.2211	0.2211	0.094

MOMENTUM FLUXES

	KG/S	DIMENSIONLESS
ANGULAR MOMENTUM FLUX = 0.005 N-M	0.005	0.372
AXIAL MOMENTUM FLUX = 1.40 N	1.40	0.049
PRESSURE FORCE = 0.050 N	0.050	0.476
THRUST = 7.459 N	7.459	0.201
SWIRL NUMBER =		7.978
SWIRL NUMBER (U.R.T. THRUST) =		1.422

ENERGY FLUXES

	J/S	DIMENSIONLESS
AXIAL KINETIC ENERGY FLUX =	1.09	0.002
TAN KINETIC ENERGY FLUX =	4.00	0.000
TOTAL KINETIC ENERGY FLUX =	0.00	0.011
PRESSURE ENERGY FLUX =	2.04	0.004
TOTAL FLOW ENERGY FLUX =	0.30	0.010

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
 VREF = 37.00 M/S BASED ON THROAT DIAMETER OF 0.0782 M
 REYNOLDS NO. = 0.388E 05

WARNING: A PITCH ANGLE OF -55.0 DEG. WAS CALCULATED AT R = 50.0 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF -52.0 DEG. WAS CALCULATED AT R = 100.0 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF -41.0 DEG. WAS CALCULATED AT R = 120.0 MM. THIS POINT HAS BEEN ELIMINATED.

EXPERIMENT NO. 1740H1

PROBE SIZE 7

TUNNEL AIR TEMPERATURE = 44.9 C

BAROMETRIC PRESSURE = 759.3 TORR

R (MM)	U (M/S)	U (M/S)	V (M/S)	PST-PA (PA)	U/VREF	U/VREF	V/VREF	VT/VREF	(PST-PA)/PREF EXPT THEORY	STREAM	GR-FUNC	GT-FUNC
0.0	-0.00	3.00	-2.50	-54.67	-0.170	0.000	-0.000	0.110	-0.100 -0.120	0.000	0.000	0.000
20.0	-0.11	4.44	-3.10	-53.54	-0.161	0.117	-0.003	0.210	-0.104 -0.112	-0.011	0.000	-0.001
40.0	-0.00	3.03	-3.01	-78.16	-0.120	0.132	-0.002	0.200	-0.000 -0.000	-0.001	0.010	-0.000
60.0	-3.67	4.00	-4.40	-49.33	-0.001	0.103	-0.110	0.190	-0.007 -0.070	-0.070	0.020	-0.020
100.0	3.00	3.00	-4.30	-53.77	0.001	0.100	-0.110	0.200	-0.007 -0.040	0.000	0.000	0.127
150.0	3.03	3.20	-3.20	-49.04	0.130	0.104	-0.000	0.217	-0.000 -0.030	0.110	0.107	0.270
170.0	0.40	5.40	-2.00	-49.72	0.171	0.170	-0.003	0.207	-0.007 -0.020	0.301	0.327	0.920
200.0	7.94	3.42	-0.90	-42.10	0.200	0.100	-0.010	0.202	-0.000 -0.020	0.000	0.070	0.027
220.0	0.01	3.00	0.07	-34.70	0.102	0.132	0.002	0.220	-0.004 -0.010	0.030	0.047	1.300
240.0	3.70	4.00	0.00	-33.10	0.101	0.101	0.017	0.100	-0.001 -0.010	1.000	0.000	1.731
260.0	4.30	3.00	1.30	-31.04	0.110	0.001	0.030	0.100	-0.000 -0.010	1.331	0.700	2.020
280.0	3.02	2.50	1.30	-28.00	0.000	0.000	0.030	0.100	-0.000 -0.010	1.000	0.000	2.210
300.0	1.00	2.20	0.20	-24.00	0.020	0.000	0.000	0.007	-0.001 -0.010	1.000	0.001	2.310
320.0	0.12	3.31	-0.32	-20.00	0.000	0.007	-0.000	0.007	-0.000 -0.010	1.000	0.000	2.300
340.0	-1.90	3.30	-0.02	-10.00	-0.001	0.000	-0.010	0.000	-0.000 -0.010	1.000	0.070	2.270
360.0	-2.00	4.14	-0.77	-10.20	-0.000	0.100	-0.020	0.101	-0.017 -0.011	1.000	0.000	2.020
380.0	-2.00	0.00	-0.40	-11.00	-0.070	0.130	-0.010	0.102	-0.010 -0.001	1.000	0.001	1.900
400.0	-2.00	3.00	-0.00	-8.00	-0.000	0.101	-0.011	0.120	-0.000 -0.000	1.000	0.000	1.100
420.0	0.00	0.00	0.00	-9.00	0.000	0.000	0.000	0.000	0.000 0.000	1.000	1.000	1.000

AT 40H1

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.209
 SECONDARY MASS FLOW = 0.543
 M-TOTAL = 0.752
 AT TEST SECTION M-TOTAL = 0.752
 M-TOT(TEST SEC)/M-TOT(INLET) = 0.979

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS = 0.1168	0.159	
M-BACK AT WALL = 0.4888	0.638	
TOTAL M-BACK = 0.5956	0.796	

MOMENTUM FLUXES

	KG/M	DIMENSIONLESS
ANGULAR MOMENTUM FLUX = 0.588 N-M	0.292	
AXIAL MOMENTUM FLUX = 0.69 N	0.307	
PRESSURE FORCE = 19.432 N	0.948	
THRUST = 24.204 N	0.626	
SWIRL NUMBER =	0.021	
SWIRL NUMBER (U.N.T. THRUST) =	0.361	

ENERGY FLUXES

	J/S	DIMENSIONLESS
AXIAL KINETIC ENERGY FLUX = 19.02	0.034	
TAN KINETIC ENERGY FLUX = 11.77	0.021	
TOTAL KINETIC ENERGY FLUX = 32.37	0.055	
PRESSURE ENERGY FLUX = -34.69	-0.063	
TOTAL FLOW ENERGY FLUX = -2.33	-0.004	

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
 VREF = 37.34 M/S BASED ON THROAT DIAMETER OF 0.0762 M
 REYNOLDS NO. = 0.391E 06

PROBE SITE 9

TUNNEL AIR TEMPERATURE = 41.2 C

BAROMETRIC PRESSURE = 754.2 TORR

W	U	V	W	PST-Pa	U/VREF	V/VREF	W/VREF	WT/VREF	1957-Pst/PREF		STREAM	GE-PUNE	GT-1
(MM)	(M/S)	(M/S)	(M/S)	(Pa)					EXPT	THEORY			
0.0	-1.90	0.00	-0.00	-30.20	-0.091	0.020	-0.010	0.009	-0.110	-0.070	0.000	0.000	0.00
10.0	0.00	0.00	0.00	-30.00	0.000	0.000	0.000	0.000	-0.110	-0.070	0.000	0.000	0.00
20.0	-3.00	2.97	0.21	-31.07	-0.093	0.000	0.000	0.100	-0.110	-0.090	-0.010	0.010	-0.01
30.0	-3.93	3.00	-0.17	-73.10	-0.090	0.100	-0.000	0.100	-0.090	-0.090	-0.000	0.000	-0.00
40.0	-2.90	0.07	-0.10	-09.00	-0.070	0.100	-0.000	0.100	-0.070	-0.090	-0.010	0.000	-0.01
100.0	-1.01	0.70	-0.00	-47.00	-0.000	0.100	-0.010	0.100	-0.000	-0.000	-0.010	0.010	-0.01
120.0	-1.20	0.00	-0.20	-41.00	-0.000	0.100	-0.000	0.100	-0.000	-0.000	-0.010	0.010	-0.00
140.0	-1.00	0.77	-0.10	-33.00	-0.000	0.100	-0.000	0.100	-0.000	-0.000	-0.010	0.010	-0.00
160.0	-1.07	0.91	-0.17	-29.00	-0.000	0.100	-0.000	0.100	-0.000	-0.000	-0.010	0.010	-0.00
180.0	-1.20	0.01	-0.00	-27.00	-0.000	0.100	-0.000	0.100	-0.000	-0.000	-0.010	0.010	-0.00
200.0	-0.07	0.00	-0.11	-20.00	-0.010	0.100	-0.000	0.100	-0.000	-0.000	-0.010	0.010	-0.00
220.0	-0.10	0.01	0.01	-21.00	-0.000	0.110	0.000	0.110	-0.000	-0.000	-0.010	0.010	-0.00
240.0	0.21	0.30	0.00	-10.00	0.000	0.110	0.000	0.110	-0.000	-0.000	-0.000	0.010	-0.00
260.0	0.70	0.20	0.10	-10.00	0.010	0.110	0.000	0.110	-0.000	-0.010	-0.010	0.010	-0.00
280.0	1.11	0.31	0.20	-10.00	0.010	0.110	0.000	0.120	-0.010	-0.010	-0.010	0.010	-0.00
300.0	1.02	0.00	0.20	-10.00	0.000	0.110	0.000	0.120	-0.010	-0.010	-0.010	0.010	-0.00
320.0	1.01	0.71	0.02	-11.00	0.000	0.100	0.010	0.100	-0.010	-0.010	-0.010	0.000	0.00
340.0	2.00	0.01	0.00	-2.00	0.000	0.100	0.010	0.100	-0.010	-0.010	-0.000	0.000	0.00
360.0	2.01	0.00	0.00	-7.00	0.000	0.110	0.010	0.100	-0.000	-0.000	0.000	0.000	0.00
380.0	2.30	0.30	0.70	-0.00	0.000	0.110	0.010	0.100	-0.000	-0.000	0.000	0.000	0.00
400.0	3.00	0.20	0.00	-3.00	0.000	0.110	0.000	0.100	-0.000	-0.000	0.000	0.000	0.00
410.0	0.00	0.00	0.00	-0.00	0.000	0.000	0.000	0.000	0.000	0.000	1.000	1.000	1.00

MASS FLOW-RATES IN KG/S

2T 40 H2

PRIMARY MASS FLOW = 0.200
SECONDARY MASS FLOW = 0.990
M-TOTAL = 0.791
AT TEST SECTION M-TOTAL = 0.991
M-TOT(1) TEST SEC/M-TOT(INLET) = 0.720

RECIRCULATION

M-BACK ON AXIS = 0.2020 KG/S 0.911 DIMENSIONLESS
M-BACK AT WALL = 0.0000 0.000
TOTAL M-BACK = 0.2020 0.911

MOMENTUM FLUXES

ANGULAR MOMENTUM FLUX = 1.140 N-M 0.921 DIMENSIONLESS
AXIAL MOMENTUM FLUX = 2.04 N 0.100
PRESSURE FORCE = 0.787 N 0.474
THRUST = 12.023 N 0.045
SWIRL NUMBER = 0.294
SWIRL NUMBER (W.R.T. THRUST) = 1.191

ENERGY FLUXES

AXIAL KINETIC ENERGY FLUX = 1.47 J/S 0.029 DIMENSIONLESS
TAN KINETIC ENERGY FLUX = 0.37 0.010
TOTAL KINETIC ENERGY FLUX = 0.00 0.015
PRESSURE ENERGY FLUX = 0.01 0.011
TOTAL FLOW ENERGY FLUX = 13.01 0.020

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
VMEP = 37.30 M/S BASED ON THROAT DIAMETER OF 0.0792 M
REYNOLDS NO. = 0.304E 05

EXPERIMENT NO. 37A01

PROBE SITE 7

TUNNEL AIR TEMPERATURE = 42.7 C

BAROMETRIC PRESSURE = 753.2 TORR

W (MM)	U (M/S)	V (M/S)	W (M/S)	PST-PW (PA)	U/VREF	V/VREF	W/VREF	WT/VREF	(PST-PW)/PREF EXPT	THEORY	STREAM	OX-FUNC	OT-FUNC
0.0	-0.78	4.89	1.83	-74.38	-0.020	0.100	0.043	0.110	-0.004	-0.078	0.000	0.000	0.000
20.0	-0.25	3.92	1.40	-74.00	-0.007	0.093	0.037	0.100	-0.004	-0.007	-0.001	0.000	-0.000
40.0	0.00	0.00	0.00	-71.33	0.000	0.000	0.000	0.000	-0.100	-0.000	-0.001	0.000	-0.000
60.0	-1.30	3.01	1.42	-69.93	-0.040	0.080	0.030	0.097	-0.003	-0.030	-0.011	0.004	-0.001
80.0	-1.03	4.19	1.29	-64.49	-0.003	0.111	0.033	0.123	-0.002	-0.001	-0.034	0.013	-0.004
100.0	-1.95	4.83	1.06	-48.89	-0.041	0.122	0.020	0.138	-0.003	-0.049	-0.004	0.020	-0.010
120.0	-1.30	4.34	0.99	-38.07	-0.037	0.119	0.020	0.123	-0.000	-0.040	-0.000	0.030	-0.017
140.0	-1.49	4.60	0.89	-30.79	-0.040	0.122	0.017	0.129	-0.040	-0.039	-0.137	0.094	-0.029
160.0	-1.37	4.49	0.42	-29.20	-0.030	0.119	0.011	0.129	-0.037	-0.032	-0.102	0.071	-0.043
180.0	-1.11	4.19	0.30	-22.00	-0.029	0.110	0.010	0.114	-0.029	-0.020	-0.227	0.049	-0.000
200.0	-0.01	4.17	0.30	-20.71	-0.021	0.110	0.009	0.113	-0.020	-0.020	-0.209	0.009	-0.073
220.0	-0.25	4.03	0.19	-19.46	-0.007	0.107	0.009	0.107	-0.020	-0.024	-0.207	0.009	-0.002
240.0	0.33	4.40	0.21	-10.99	0.009	0.110	0.006	0.110	-0.023	-0.021	-0.209	0.100	-0.000
260.0	0.03	4.67	0.17	-13.04	0.022	0.124	0.009	0.120	-0.010	-0.010	-0.294	0.100	-0.003
280.0	1.07	4.10	0.31	-13.00	0.020	0.131	0.009	0.134	-0.010	-0.017	-0.199	0.119	-0.020
300.0	1.94	9.10	0.32	-11.00	0.001	0.137	0.000	0.143	-0.010	-0.010	-0.119	0.140	0.020
320.0	2.81	9.29	0.30	-11.37	0.000	0.130	0.000	0.191	-0.010	-0.012	0.004	0.210	0.123
340.0	2.70	9.19	0.92	-9.99	0.002	0.137	0.010	0.199	-0.007	-0.009	0.179	0.312	0.203
360.0	2.97	9.36	0.09	-6.10	0.070	0.142	0.010	0.103	-0.009	-0.007	0.304	0.470	0.400
380.0	3.24	4.40	1.10	-1.04	0.000	0.129	0.020	0.190	-0.002	-0.009	0.020	0.679	0.603
400.0	3.30	4.02	1.20	-2.79	0.009	0.120	0.033	0.190	-0.004	-0.004	0.000	0.910	0.907
410.0	0.00	0.00	0.00	-0.00	0.000	0.000	0.000	0.000	0.000	0.000	1.000	1.000	1.000

3T40H1

MASS FLOW RATES IN KG/S

PRIMARY MASS FLOW = 0.207
 SECONDARY MASS FLOW = 0.350
 M-TOTAL = 0.700
 AT TEST SECTION M-TOTAL = 0.681
 M-TOT(1/2 TEST SEC)/(M-TOT(1/2 INLET)) = 0.865

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS	0.1930	0.293
M-BACK AT WALL	0.0000	0.000
TOTAL M-BACK	0.1930	0.293

MOMENTUM FLUXES

		DIMENSIONLESS
ANGULAR MOMENTUM FLUX	1.397 N-M	0.630
AXIAL MOMENTUM FLUX	2.93 N	0.007
PRESSURE FORCE	0.030 N	0.309
THRUST	11.190 N	0.300
SWIRL NUMBER		7.292
SWIRL NUMBER (U.R.T. THRUST)		1.003

ENERGY FLUXES

	J/S	DIMENSIONLESS
AXIAL KINETIC ENERGY FLUX	3.12	0.000
TAN KINETIC ENERGY FLUX	9.10	0.017
TOTAL KINETIC ENERGY FLUX	12.93	0.023
PRESSURE ENERGY FLUX	1.00	0.000
TOTAL FLOW ENERGY FLUX	14.91	0.027

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
 VREF = 37.02 M/S BASED ON THROAT DIAMETER OF 0.0762 M
 REYNOLDS NO. = 0.300E 00

WARNING: A PITCH ANGLE OF -99.3 DEG. WAS CALCULATED AT R = 100.0 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF -92.4 DEG. WAS CALCULATED AT R = 120.0 MM. THIS POINT HAS BEEN ELIMINATED.

WARNING: A PITCH ANGLE OF 86.8 DEG. WAS CALCULATED AT R = 300.0 MM. THIS POINT HAS BEEN ELIMINATED.

EXPERIMENT NO. 1749H1

PROBE SIZE 17

TUNNEL AIR TEMPERATURE = 42.2 C

BAROMETRIC PRESSURE = 759.3 TORR

R (MM)	U (M/S)	W (M/S)	V (M/S)	PST-PU (PA)	U/VREF	V/VREF	W/VREF	VT/VREF	(PST-PU)/PREF		STREAM	ST-PUNC	ST-PU
									EXPT	THEORY			
0.0	-0.00	3.39	-2.09	-48.97	-0.161	0.000	-0.077	0.216	-0.112	-0.152	0.000	0.000	0.000
20.0	-0.01	0.03	-3.23	-50.97	-0.176	0.120	-0.090	0.233	-0.112	-0.130	-0.012	0.000	-0.002
40.0	-0.77	5.50	-3.41	-82.14	-0.193	0.140	-0.081	0.232	-0.110	-0.107	-0.044	0.022	-0.010
60.0	-0.66	9.90	-3.09	-60.62	-0.126	0.199	-0.102	0.226	-0.112	-0.060	-0.091	0.041	-0.030
80.0	-2.01	9.67	-4.02	-60.20	-0.093	0.191	-0.131	0.207	-0.101	-0.074	-0.130	0.093	-0.093
100.0	2.74	9.40	-0.90	-51.07	0.073	0.146	-0.132	0.210	-0.080	-0.044	-0.070	0.042	0.039
120.0	9.47	0.92	-3.32	-59.56	0.149	0.173	-0.000	0.243	-0.079	-0.061	0.044	0.129	0.193
140.0	0.03	0.00	-2.22	-64.78	0.102	0.179	-0.099	0.290	-0.097	-0.034	0.234	0.320	0.304
160.0	7.21	9.33	-1.17	-40.24	0.102	0.142	-0.031	0.240	-0.090	-0.020	0.479	0.390	0.300
220.0	7.02	9.99	0.34	-59.72	0.211	0.147	0.009	0.297	-0.070	-0.024	0.702	0.931	1.379
240.0	0.07	0.23	0.03	-39.29	0.181	0.119	0.022	0.200	-0.090	-0.021	1.092	0.094	1.097
260.0	0.70	3.00	1.40	-39.10	0.129	0.090	0.040	0.102	-0.044	-0.020	1.204	0.000	2.200
280.0	2.40	2.77	1.70	-27.30	0.060	0.073	0.047	0.100	-0.030	-0.010	1.407	0.004	2.407
320.0	0.13	2.40	0.09	-27.40	0.003	0.009	0.017	0.000	-0.030	-0.017	1.000	0.079	2.077
360.0	-2.34	3.00	0.00	-22.03	-0.030	0.104	0.002	0.110	-0.020	-0.010	1.003	0.003	2.002
380.0	-2.37	0.37	-0.22	-10.20	-0.063	0.110	-0.000	0.132	-0.023	-0.019	1.404	0.002	2.247
390.0	-2.90	9.16	-0.32	-13.04	-0.079	0.137	-0.000	0.190	-0.010	-0.013	1.200	0.041	1.700
400.0	-2.63	9.10	0.02	-0.91	-0.070	0.137	0.014	0.155	-0.011	-0.011	1.000	0.000	1.204
414.3	0.00	0.00	0.00	-0.00	0.000	0.000	0.000	0.000	0.000	0.000	1.000	1.000	1.000

AT 45H1

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.200
 SECONDARY MASS FLOW = 0.902
 M-TOTAL = 0.702
 AT TEST SECTION M-TOTAL = 0.770
 M-TOT/TEST SECI/M-TOT/INLET = 1.014

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS = 0.1352	0.176	
M-BACK AT WALL = 0.4888	0.604	
TOTAL M-BACK = 0.6240	0.770	

MOMENTUM FLUXES

		DIMENSIONLESS
ANGULAR MOMENTUM FLUX = 0.939 N-M		0.243
AXIAL MOMENTUM FLUX = 0.73 N		0.337
PRESSURE FORCE = 17.003 N		0.612
THRUST = 29.020 N		0.997
SWIRL NUMBER =		0.723
SWIRL NUMBER (V.M.T. THRUST) =		0.294

ENERGY FLUXES

	J/S	DIMENSIONLESS
AXIAL KINETIC ENERGY FLUX = 22.37	0.841	
TAN KINETIC ENERGY FLUX = 10.70	0.020	
TOTAL KINETIC ENERGY FLUX = 34.09	0.604	
PRESSURE ENERGY FLUX = -30.47	-0.671	
TOTAL FLOW ENERGY FLUX = -3.40	-0.606	

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
 VREF = 37.02 M/S BASED ON THROAT DIAMETER OF 0.0702 M
 REYNOLDS NO. = 0.387E 04

EXPERIMENT NO. 276942

PROBE SITE 7

TUNNEL AIR TEMPERATURE = 44.0 C

BAROMETRIC PRESSURE = 756.3 TORR

R (IN)	U (IN/S)	W (IN/S)	V (IN/S)	PST-PP (PA)	U/VREF	W/VREF	V/VREF	WT/VREF	(PST-PP)/PREP		STREAN	GX-PUNC	GT-P
									EXPT	THEORY			
0.0	-2.16	1.38	-0.92	-49.99	-0.057	0.036	-0.014	0.009	-0.112	-0.072	0.000	0.000	0.00
20.0	0.00	5.88	0.00	-57.99	0.000	0.000	0.000	0.000	-0.123	-0.072	0.000	0.000	0.00
40.0	-3.29	2.93	-1.06	-64.99	-0.067	0.067	-0.020	0.113	-0.109	-0.070	-0.014	0.010	-0.00
60.0	-2.46	3.79	-0.47	-71.01	-0.079	0.109	-0.023	0.127	-0.089	-0.064	-0.040	0.030	-0.00
80.0	-2.89	4.48	-0.43	-80.00	-0.071	0.116	-0.011	0.130	-0.078	-0.037	-0.000	0.053	-0.00
100.0	-2.79	9.17	-0.43	-91.19	-0.072	0.130	-0.011	0.199	-0.083	-0.090	-0.140	0.083	-0.02
120.0	-2.29	9.88	-0.90	-44.07	-0.090	0.130	-0.013	0.147	-0.099	-0.043	-0.190	0.113	-0.03
140.0	-1.94	4.94	-0.31	-37.11	-0.091	0.130	-0.009	0.140	-0.047	-0.030	-0.130	0.130	-0.05
160.0	-1.36	4.00	-0.44	-33.36	-0.038	0.120	-0.013	0.130	-0.042	-0.033	-0.109	0.190	-0.07
180.0	-1.03	4.83	-0.30	-26.77	-0.027	0.127	-0.010	0.131	-0.020	-0.030	-0.193	0.107	-0.09
200.0	-0.44	4.49	-0.07	-28.78	-0.013	0.177	-0.002	0.110	-0.024	-0.020	-0.102	0.172	-0.10
220.0	-0.17	4.07	-0.12	-26.09	-0.004	0.129	-0.003	0.120	-0.031	-0.024	-0.197	0.173	-0.11
240.0	0.31	3.90	-0.39	-19.01	0.004	0.104	-0.009	0.109	-0.020	-0.011	-0.193	0.174	-0.10
260.0	0.92	4.78	0.04	-19.90	0.029	0.120	0.001	0.129	-0.024	-0.019	-0.190	0.179	-0.00
280.0	1.34	4.72	0.20	-19.43	0.039	0.120	0.007	0.130	-0.023	-0.017	-0.203	0.199	-0.04
300.0	1.73	4.79	0.29	-14.00	0.046	0.120	0.008	0.139	-0.019	-0.014	-0.107	0.220	0.01
320.0	1.87	4.40	0.93	-11.07	0.092	0.110	0.014	0.129	-0.019	-0.013	-0.074	0.273	0.107
340.0	2.02	4.87	0.40	-0.31	0.009	0.123	0.019	0.102	-0.010	-0.011	0.000	0.393	0.223
360.0	3.12	4.00	0.73	-7.04	0.002	0.127	0.019	0.192	-0.010	-0.009	0.104	0.400	0.300
380.0	3.09	4.49	0.73	-9.24	0.097	0.120	0.019	0.103	-0.007	-0.007	0.973	0.071	0.032
400.0	3.77	4.34	1.30	-4.99	0.000	0.114	0.034	0.199	-0.000	-0.000	0.000	0.010	0.003
410.3	0.00	0.00	0.00	-0.00	0.000	0.000	0.000	0.000	0.000	0.000	1.000	1.000	1.000

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.209
 SECONDARY MASS FLOW = 0.999
 M-TOTAL = 0.707
 AT TEST SECTION M-TOTAL = 0.651
 M-TOT(1/TEST SEC)/M-TOT(1/INLET) = 0.963

2T4542

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS	0.2009	0.401
M-BACK AT WALL	0.0000	0.000
TOTAL M-BACK	0.2009	0.401

MOMENTUM FLUXES

	KG/S	DIMENSIONLESS
ANGULAR MOMENTUM FLUX	1.362 N-M	0.000
AXIAL MOMENTUM FLUX	3.18 N	0.100
PRESSURE FORCE	10.308 N	0.420
THRUST	13.929 N	0.465
SWIRL NUMBER		9.570
SWIRL NUMBER (V.R.T. THRUST)		1.303

ENERGY FLUXES

	J/S	DIMENSIONLESS
AXIAL KINETIC ENERGY FLUX	3.40	0.000
TAN KINETIC ENERGY FLUX	7.10	0.013
TOTAL KINETIC ENERGY FLUX	10.51	0.020
PRESSURE ENERGY FLUX	3.91	0.007
TOTAL FLOW ENERGY FLUX	14.72	0.027

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
 VREF = 37.91 M/S BASED ON THROAT DIAMETER OF 0.0762 m
 REYNOLDS NO. = 0.300E 00

WARRIOR A PITCH ANGLE OF 33.3 DEG. WAS CALCULATED AT P = 40.0 MP. THIS POINT HAS BEEN ELIMINATED.

EXPERIMENT NO. 3745H1

PROBE SITE 7

TUNNEL AIR TEMPERATURE = 30.2 C

BAROMETRIC PRESSURE = 753.2 TORR

R (MM)	U (M/S)	V (M/S)	W (M/S)	PST-PW (PA)	U/VREF	U/VREF	V/VREF	W/VREF	(PST-PW)/PREF EXPT THEORY	STREAM	EX-FUNC	GT-FU
0.0	-1.10	3.71	1.07	-74.12	-0.030	0.100	0.030	0.110	-0.030 -0.034	0.000	0.000	0.000
20.0	-0.75	2.90	1.77	-77.10	-0.020	0.070	0.040	0.094	-0.100 -0.070	-0.002	0.000	-0.000
40.0	-1.00	3.47	1.41	-79.30	-0.051	0.094	0.030	0.113	-0.030 -0.050	-0.010	0.012	-0.003
60.0	-2.07	4.34	1.20	-71.93	-0.050	0.123	0.032	0.130	-0.033 -0.053	-0.041	0.027	-0.007
100.0	-2.00	4.00	1.00	-60.45	-0.050	0.131	0.020	0.140	-0.077 -0.040	-0.102	0.040	-0.019
120.0	-1.71	4.02	0.72	-49.00	-0.040	0.130	0.010	0.130	-0.050 -0.040	-0.140	0.000	-0.020
140.0	-1.02	4.00	0.00	-39.44	-0.044	0.123	0.010	0.132	-0.044 -0.030	-0.130	0.000	-0.030
160.0	-1.01	4.70	0.44	-32.10	-0.030	0.120	0.012	0.130	-0.042 -0.031	-0.240	0.107	-0.050
180.0	-1.07	4.47	0.34	-27.42	-0.020	0.121	0.000	0.124	-0.030 -0.027	-0.202	0.121	-0.072
200.0	-0.70	4.21	0.20	-21.00	-0.010	0.114	0.000	0.110	-0.020 -0.024	-0.320	0.120	-0.000
220.0	-0.30	4.04	0.10	-21.00	-0.010	0.122	0.004	0.120	-0.027 -0.021	-0.350	0.130	-0.000
240.0	0.20	4.00	0.17	-10.70	0.007	0.120	0.000	0.127	-0.024 -0.010	-0.350	0.130	-0.000
260.0	0.02	4.00	0.10	-10.00	-0.020	0.127	0.004	0.120	-0.021 -0.010	-0.322	0.140	-0.070
280.0	1.22	0.10	0.21	-14.00	0.030	0.130	0.000	0.140	-0.010 -0.014	-0.250	0.150	-0.030
300.0	1.70	0.20	0.21	-14.00	0.047	0.140	0.000	0.150	-0.010 -0.011	-0.102	0.150	0.020
320.0	2.10	0.40	0.20	-10.00	0.050	0.140	0.007	0.150	-0.014 -0.000	-0.027	0.200	0.130
340.0	2.70	0.30	0.30	-7.20	0.070	0.140	0.000	0.160	-0.000 -0.000	0.100	0.300	0.270
360.0	3.01	0.21	0.41	-4.30	0.091	0.140	0.011	0.160	-0.000 -0.003	0.370	0.300	0.400
380.0	3.30	0.11	0.70	-3.00	0.000	0.130	0.020	0.160	-0.000 -0.001	0.030	0.700	0.007
400.0	2.00	0.30	1.00	0.00	0.070	0.110	0.020	0.140	0.001 0.001	0.007	0.030	0.020
410.0	0.00	0.00	0.00	-0.00	0.000	0.000	0.000	0.000	0.000 0.000	1.000	1.000	1.000

MASS FLOWRATES IN KG/S

PRIMARY MASS FLOW = 0.300
 SECONDARY MASS FLOW = 0.999
 M-TOTAL = 0.700
 AT TEST SECTION M-TOTAL = 0.837
 M-TOT(1/2 TEST SECT)/M-TOT(INLET) = 0.837

3T45H1

RECIRCULATION

	KG/S	DIMENSIONLESS
M-BACK ON AXIS	0.2309	0.342
M-BACK AT WALL	0.0000	0.000
TOTAL M-BACK	0.2309	0.342

MOMENTUM FLUXES

		DIMENSIONLESS
ANGULAR MOMENTUM FLUX	1.301 N-M	0.648
AXIAL MOMENTUM FLUX	2.81 N	0.893
PRESSURE FORCE	9.973 N	0.408
THRUST	12.103 N	0.433
SWEEL NUMBER		0.894
SWEEL NUMBER (w.r.t. THRUST)		1.487

ENERGY FLUXES

	J/S	DIMENSIONLESS
AXIAL KINETIC ENERGY FLUX	2.87	0.009
VAN KINETIC ENERGY FLUX	0.00	0.017
TOTAL KINETIC ENERGY FLUX	11.66	0.023
PRESSURE ENERGY FLUX	4.04	0.000
TOTAL FLOW ENERGY FLUX	19.90	0.030

MISCELLANEOUS DATA

PRESSURE AT WALL = 0.00 PA
 VREF = 37.00 M/S BASED ON THROAT DIAMETER OF 0.0702 M
 REYNOLDS NO. = 0.302E 00

APPENDIX II

Data Reduction Program

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JOB INCH=CM? INCH=CM?
*****
      ANNUAT5
      THIS PROGRAM PRODUCES A TABULATED PRINTOUT
      OF THE RESULTS FOR AN EXPERIMENT USING THE
      9-HOLE PROBE (DC-129).
*****

MODIFICATIONS:

MAY 18 1980. THE ONE MEASUREMENT FOR P1-PBAR MUST ALWAYS
BE TAKEN AT THE AXIS POSITION WHEN USING THIS PROGRAM. THIS
CHANGE REPLACES THE PREVIOUS VARIABLE CONDITION (LINE 88)
FROM P1=P1 TO P1=P1(29), WHERE THE VALUE 29 IS THE ARRAY
POSITION CORRESPONDING TO THE AXIAL LOCATION.

      INTEGER EXPT,EXPTA,EXPAN,A,AW1,AP1,AP2
      REAL PMLD,SMFLD,HTOT1,UNIT1,AVAV1791,AP1P21791,
      AP1P1791,R1791,YA1791,VA1791,PLP1791,PLP1791,P1791,PSF1791,
      LM1791,V1791,PR1791,UJHVF1791,HTCT,LCREF1791,LUREP1791,
      IPSTAT1791,TPSTAT1791,V1791,STFNC1791,VTHCF1791,HTCT,HTCTVD,
      IMPACH1,MBACH2,MBACT,UBACH1791,UBACH21791,GIFUNC1791,
      IMPAP1791,PAP1791,PITCH1791,VVNEF1791,VY1791

      READ IN EXP, NO., PROBE SIZE AS 'T','S',1,2 OR 3,
      TEMPERATURE IN RELVING,
      BAROMETRIC PRESSURE IN MM, HG, N = NO. OF RADIIUS
      POSITIONS FROM AXIS TO BEAR WALL INCLUSIVE, M = NO. OF
      ADDITIONAL RADIIUS POSITIONS MEASURED ON THE FAR SIDE OF AXIS,
      THE ONE MEASUREMENT OF PL-PBAR IN TCRP (THE POSITION
      WHERE PL-PBAR WAS TAKEN MUST BE ENTERED ON LINE 88-1. THE
      UNSLIDER READING IN MM, P3 POSITION WHERE PROBE IS AT AXIS,
      AND THE THROAT RADIUS IN M.

      READ(15,30) EXPT,EXPTA,PROBE,TP,TS,PMLD,SMFLD,PBAR,N,M,
      AP1P2A,AXIS,THROAT
      FCNMT1A,A2,A2,ZF0.1,ZF7.0,ZF0.1,Z13,Z13,ZF0.3,ZF7.0,ZF7.0
      PBAR=PBAR+.9964
      HTCT=SMFLD*SMFLD
      NUPN=0
      NHH=0.24

      UNSLIDER READING IN MM., ANGLE AT P1=P3 IN DEGREES, AND
      P1=P2, P1=PMALL AND P4=P5 IN TCRP ARE READ IN FROM THE AXIS
      ACROSS THE DIAPETER.

      DO 1 IN1,MUM
      READ(15,31) UNIT1,ATAV1,AP1P21,AP1P11,AP4P511

      CHECK THAT INPUT IS CORRECT FOR READ-IN FORMAT.

      FORMAT(1F9.1,1F7.1,1F7.3,1F7.3,1F9.1)
      L=29*1-1
      N1=(UNIT1)-AR11/1003
      VAD(L)=ATAV1*0.017493

      P1P21=AP1P211-133.32
      P1P11=AP1P111-133.32
      P4P511=AP4P5111-9.61

      CONTINUE
      NHH29=M

      PRESSURE AT WALL IS CALCULATED FROM THE ONE MEASUREMENT TAKEN
      FOR PL-PBAR AND THE POSITION OF THIS MEASUREMENT IS ENTERED FOR
      PL=PMALL(29). NOTE THAT THE 29TH ENTRY IN ALL ARRAYS IS AT THE
      AXIS, THE NTH ENTRY IS AT THE WALL AND THE MTH ENTRY IS THE LAST
      MEASUREMENT AND THE 1ST ENTRY IN ALL ARRAYS. HENCE 'N1' IS LESS
      THAN OR EQUAL TO 29.

      PH=P1PBAR+133.32-PLP1(29)
      A29
      M0
      L09
      DO 2 J=MM,MN
      IF(J.LE.41) THEN GO
      TCRP
      ELSE GO
      TMS
      END IF
      IF(P1P21J).EQ.01THEN GO
      X09
      ELSE GO
      SMFAP1(J)/P1P21J

      PITCH ANGLE IS A FUNCTION OF 'S' AND CONSISTS OF THE
      FOLLOWING TWO CALCULATION LINES.

      IF(S.LE.0.1779)THEN GO
      X(109.185)/0.0328
      ELSE GO
      X(109.21)/0.0493
      END IF
      END IF
      IF(14.LY.-481.0D,14.97.481)THEN GO
      IF(J.EQ.29)THEN GO
      PMINT 29.5
      FORMAT(1111.14,10.44N10: A PITCH ANGLE OF°,P0.1,
      ° 010. WAS CALCULATED ON THE AXIS. ITS DATA HAS BEEN ALTERED
      FOR INTEGRATION.)
      L=J-1
      L=1
      PM11100
      O11100
      V11100
      U11100
      UBACH211100
      GUM=11111
      GO TO 2
      ELSE GO
      PMINT 20.3,0.01101393
      FORMAT(1111.14,10.44N10: A PITCH ANGLE OF°,P0.1,
      ° 017. WAS CALCULATED AT R 0.0,0.1,
      ° MM. THIS POINT HAS BEEN ELIMINATED.)
      NHH1
      IF(14.98.481.480.014.97.481)THEN GO
      GO TO 3

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100 200 IF
101 200 IF
102
103 THE FOLLOWING IS THE CALCULATION CURVE FOR THE VELOCITY
104 PRESSURE COEFFICIENT VS PITCH ANGLE
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106 1
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REMARKS: A PITCH ANGLE OF -41.0 DEG. WAS CALCULATED AT 0 0 00.0 UN. THIS POINT HAS BEEN ELIMINATED.